Concept Analysis
in
Social Studies

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Abstract

This project was undertaken because of a need to analyse concepts in social science more specifically and sequence them more carefully in a social science program. Concepts have been identified vaguely on many curriculum documents or left in isolation from each other when they are specifically identified. The project's aim was to identify a method for analysing concepts and sequencing their teaching on some rational basis.

Once the method for analysing concepts was identified a questionnaire was designed and administered to a random sample of students at the grade three, five and eight levels. The questionnaire attempted to measure their comprehension of specific social science concepts at several levels which became progressively more complex. The major hypothesis was that there would be a direct correlation between age and achievement on the questionnaire. The raw scores were seriated and correlated with the ages of the students using the rank-difference-squared method.

For the majority of areas tested it was found that there was a significant correlation between age and achievement on the questionnaire. Variation in the correlation coefficients generated suggests that comprehension of social science concepts is not simply a function of age but is probably a function of several inter-related factors such as reading ability, skill in Basic Thinking Skills and age.

Thirty students completed each test. There were three tests in the questionnaire.

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CHAPTER ONE

AN INTRODUCTION TO THE STUDY

Chapter 1

This project was undertaken to develop a method for analysing social science concepts. Popular methods for sequencing social science concepts are vague and subjective. The methods for analysing social science concepts are vague and subsequently evaluation of concept development is vague.

The aim of the project is to identify a method for analysing social science concepts and sequencing them for instruction so learnings may be more definitely evaluated and instruction may be sequenced to improve efficiency. Because concept understanding is part of a definite chain of learning, improving the efficiency of instruction in concepts should benefit instruction and comprehension in other more complex stages in social science learnings. Concepts represent organizations of facts which have a critical use in problem solving in social science. Concepts are organizations of facts which eliminate repetitive, redundant learning. With a fully developed understanding of a concept such as leadership, specific examples of that concept may be understood more quickly and more efficiently. It eliminates the need to relearn the idea of leadership for every example encountered.

Concepts can be analysed and their characteristics definitely listed. These characteristics are called attributes. Usually concepts have two or more attributes. These attributes may combine in different ways to define the concept. Concepts can also be analysed according to their relationships to other concepts. Some concepts include several subordinate concepts as attributes. Some concepts are synonymous with other concepts and some concepts act as specific attributes for other concepts.

Concepts are a middle link in a specific chain of learnings. They represent the first classification of a physical environment into an abstract comprehension. The concept "cup" for example, encompasses a wide range of receptacles with specific characteristics, at its mature level. Concept learnings represent a mid-point in a chain of learnings because the learnings prior to understanding concepts are direct responses to a concrete environment while the learnings following concept understanding are increasingly sophisticated abstractions of the concrete environment.

Concepts can be objectively analysed and sequenced for learning. Individual concepts can be divided into levels of learning. The simplest level is identifying examples of the concept. The next level involves a classification of the perceived characteristic of several examples into union sets of common characteristics. The final level involves enumerating these same characteristics as the attributes which define the concept. The process is cyclical because the attributes may be defined as further examples of the concept are encountered. This aspect emphasises the importance of experience with examples of the concept to develop a complete comprehension of it.

Using this outline of the development of concept comprehension a multiple choice questionnaire was designed to determine whether concept comprehension did improve with age. The concepts used were selected from Ministry of Education curriculum documents.

The assumption underlying the questionnaire was that the concept development model that was used accurately reflected the correct sequence and levels of comprehension that an individual progressed through in learning a concept.

The questionnaire was applied to randomly selected classes at the grade three, five and eight level in Bramalea Ontario. The major hypothesis was that there would be a direct relationship between the scores on the questionnaire and the ages of the students. The minor hypothesis predicted that all students would achieve better results on the initial more concrete levels of concept comprehension tested in the questionnaire and that all students would achieve better results on the concepts for which there were more concrete examples.

CHAPTER TWO

A REVIEW OF THE LITERATURE

The aim of concept learning may be analysed philosophically and educationally. An analysis of concepts will result in increased understanding, according to Harre.[1] Ausubel interprets the educational goal of concept learning as the acquisition of a clear, stable organised body of knowledge in which increases accuracy, clarity, longevity in memory and transferability for the student and the teacher.[2]

The continuing philosophical debate about concepts has influenced the expectations and hypotheses in concept learning research. Logical positivists believe that meaning is related to the method of checking for truth and falsity. Linguistic analysts believe meaning is related to the word's social use. Post linguistic analysts believe some concepts exist as non-verbal images.[3] All analysts emphasize correlation of concepts with words which introduce the rationality of word structures and formal logic.[4]

Definitions of the term concept are numerous and various. It is the label of a group of things that have something in common.[5] It is the vehicle of thought.[6]

[1] Harre, Formal Analysis of Concept, 5

[2] Ausubel, "Meaningful Reception Learning and the Asquisition of Concept", 168

[3] ibid

[4] ibid, 13

[5] Archer, "Psychological Nature of Concepts", 37

[6] Harre, op. cit., 3

It is ordered information about the properties of one or more things, objects, events or processes.[7] It is a series of experiences which define a class of events.[8] Concepts are formed when overt behaviour comes to depend on certain properties of stimulus patterns while disregarding other properties.[9] A concept is the formation of a similar response to dissimilar stimuli[10] and/or the aquisition of a mediating process that can be detached from stimulus objects.[11] It is ordered information about the properties of one or more things that enables any one class or thing to be differentiated from another.[12]

Gagne has identified the common elements among the various definitions. Concepts are an inferred process which require the discrimination of similar and dissimilar stimulus objects. The end performance of learning requires that the learner place an object in a class.[13] Concepts may be learned by observation and by definition.[14]

Concepts may be analysed in terms of their defining attributes. An attribute is a common characteristic possessed by all examples of the concept.

[7]Klausmeier, Sipple and Allen, "First Cross Sectional Study of Attainments of the Concepts Equilateral Triangle and Cutting Tools by Children age Five to Sixteen",

[8]Gagne, "Learning of Principles", 83

[9]ibid, 82

[10]ibid

[11]ibid

[12]Klausmeier, Ghatala and Frayer Conceptional Learning and Thought, 4

[13]Gagne, "Learning of Principles", 83

[14]ibid, 90

Any attribute may vary in value while still maintaining the definition; for example, in the concept "blue squares", colour and shape are attributes while blue and square are values. The value blue may contain several hues that would be permissible. By defining attributes and values a concept may be specifically described. Defining attributes are ones in which a change in attribute value alters class inclusion.[15] Klausmeier has developed an interesting analysis of concepts because the product of his analysis analyses itself, producing a concept of a concept. The attributes of the concept, "concept", are defined as power, structure, learnability, usability, validity and generality. Power identifies the extent to which it facilitates or explains other concepts. Structure refers to the relationship of the definition and defining attributes which itself is specifically based on a classification of sixteen possibilities of partitioning a stimulus population.[16] Learnability varies in relation to learning, culture and language.[17] Usability is defined as the use of the concept in forming principles and solving problems.[18] Validity is the extent to which experts agree upon a definition.[19]

[15] Klausmeier Ghatala and Frayer, op. cit., 33

[16] ibid, 8

[17] ibid, 6

[18] ibid, 7

[19] ibid

Generality refers to the placement of a concept in a hierarchical sequence of progressively increasing inclusion of more specific concepts and a corresponding decrease in the number of specific attributes.[20]

Concepts represent a critical intermediary experience between perception and the generalisation of perception resulting in theories and systems formulations. The development of concepts frees thought and expression from the physical environment.[21] They represent wide modifications of perceptions-so wide that the organization of those perceptions may be re-arranged.[22] Concept comprehension reduces the need for additional learning and relearning because the individual can generalise to new instances and identify non instances readily.[23] Direct experience with new instances serves to increase the validity and power of the concept for the individual.[24]

Bruner has identified four main uses of concept learning. It reduces the complexity of the environment. It is the means by which the objects about us are identified.

[20] ibid, 8

[21] Gagne, Conditions of Learning, 139

[22] Russel, Children's Thinking, 121

[23] Klausmeier, Sipple and Allen, op. cit., 8

[24] Klausmeier, Ghatala and Frayer op. cit., 23

It reduces the constant necessity for relearning. It provides direction for instrumental activity and ordering and relating of classes and events.[25]

Concepts are also the building blocks of more complex organizations of experience. When concepts are related to each other, they form principles.[26] In order to learn any principle the individual must know the concepts involved and the operations relating them.[27] By using principles associated with concepts, problems may be solved.[28] Particularly in social science, problem solving depends upon an understanding of specific concepts.

Merrifield identifies eight types of learning, based on Gagne's outline. The eight types are: Signal learning, stimulus response learning, chaining, verbal associations, multiple discrimination, concept learning, principle learning, and finally problem solving.[29] Although the sequences may be debated, it emphasises the intermediary position of concept learning to simpler and more complex organizations of knowledge. Concept learning represents the initial step and the foundation into the areas of progressive abstraction and generalization.

[25]Archer, op. cit., 45

[26]Gagne, Conditions of Learning, 139

[27]Gagne, "Learning of Principles", 87

[28]Klausmeier, Sipple and Allen, op. cit., 9

[29]Merrifield "Analysis of concepts from the point of view of structure of intellect", 29

Just as the set of concepts can be identified and removed from the set of different forms of knowledge, the concept set may be subdivided into several kinds of components. This task has also been done several different ways. Historically concepts have been subdivided based on a categorical system developed by Aristotle and based upon the kinds of questions that one can ask about a specific concept.[30] Concepts may also be analysed hierarchically based upon the explaining power of the concept with more global concepts having the greater value.[31]

Archer categorizes concepts according to their evaluation on several criteria which are: the amount of relevant information, the amount of irrelevant information, the number of alternate answers and the decreasing probability of the occurence of relevant attributes.[32]

Fancett has outlined several concept categories based on categories developed at the University of Syracuse curriculum centres. These categories are based on the kinds of knowledge that the concept represents.

Substantive concepts are those which are commonly encountered in specific areas of study such as "secularization", "power", "compromise" and "adjustment".

[30]Harre, op. cit., 15

[31]ibid

[32]Archer, op. cit., 38

Value concepts reflect beliefs and interpersonal relations such as "empathy" and "government by the people". Concepts of method emphasise the skills by which knowledge is obtained and organised such as "observation", "classification", "measurement", "analysis" and "synthesis."[33]

Bruner has outlined the most systematic and applicable analysis of the types of concepts. He classifies concepts as conjunctive, disjunctive and relational.[34] A conjunctive concept is characterised by the appropriate value of several attributes. Disjunctive concepts are characterised by the presence of two or more attributes individually in each instance such that x or y or z may be present and the concept would still apply to the particular example. In relational concepts there is a specifiable relationship between or among attribute components.[35]

It is this method of classifying concepts which has been used most frequently in research and in theoretical papers as a method of communicating ideas, analysing results and organising experiments. It is interesting to note also that conjunctive, disjunctive and relational concepts represent a seriation in terms of learning difficulty. Bruner observes that North American people have a predilection for creating and understanding conjunctive concepts more than the others.[36]

[33] Fancett, Social Science Concepts and the Classroom. 7

[34] Bruner, Study of Thinking, 41

[35] ibid

[36] ibid, 58

Glasser had noted the same pattern and concluded that the type of concept preferred and learned easier is based on prior society experience and the degree of logical complexity of the type of concept being learned.[37]

Gagne has added another dimension to Bruner's analysis by classifying the three kinds of concepts according to the way in which they are learned. Conjunctive concepts may be learned by direct observation whereas disjunctive and relational concepts are learned by definition.[38] This occurs because many disjunctive and relational concepts, such as weight, do not have positive and negative examples, so the concept attributes and values must be given rather than induced before examples of the concept can be identified.[39]

Although the order of learning difficulty has been identified using a specific set of types of concepts, there is still another way of organising concepts. Concepts may also be organised by the way they relate to other concepts. The three relationships are labelled supra-ordinate, subordinate and co-ordinate. A supra-ordinate relation is one in which a specific concept is identified as a component or subset of a larger concept or class. Leadership is a subconcept of the concept government. A subordinate relation is one in which a specific concept is analysed or subdivided into its component subsets of concepts. A co-ordinate relation is the correlation of a specific concept with synonymous or equivalent concepts.[40]

[37]Glasser, Concept Learning and Teaching, 21

[38]Gagne, "Learning of Principles", 89

[39]ibid, 88

[40]Klausmeier, Sipple and Allen, op. cit., 9

The analysis of concept relationships emphasises the matrix pattern of concept attainment. The achievement of some concepts is dependent upon the achievement of specific sub-concepts in a continuous chain of learning. This represents one of the major problems in concept research and concept teaching. It is necessary to identify the logical relationships in both areas as a prelude to any action and as a vital component in any evaluation. Since relationships, although logical, are not always objective, both research and instruction confront an enigmatic problem of subjective relationships. These relationships are particularly evident in examining concept development in children.

The next topic is difficult because it is self-negating. To explain the correspondence of developmental stages and concept development without identifying the limitations and specific applications is oversimplifying. Yet to include the application is to lose the overall scheme of development; consequently, the developmental stages will be corresponded to concept development as succinctly as possible and followed by a consideration of specific factors which influence the correspondence.

The specific variables which relate concept development and maturational level are the necessity of action and the development of images and language. In the sensori-motor stage, concepts are understood only as a factor of perception and action.[41]

[41]Piaget, Child and Reality, 10

In the complete absence of speech and the extremely limited indication of intelligence, it may be debatable that there is concept development at all. The transition from sensori-motor to preoperational stage heralds the beginning of conceptional learning. The preoperational stage sees the development of mental images. These images are a set of symbols which provide more or less accurate but delayed translation of the level of comprehension of the individual.[42] These images are not sufficient to develop the operatory structures of classification, seriation, correspondence and matrices because they are not reproductive images which are limited to previous preceptions.[43] Static situations are described in terms of configurations and transformations are described in terms of subjective causality.[44] This stage is characterised by universal finalism, a combination of physical and psychical realism, animism and systematic artificialism.[45]

Whereas the images during the preoperational stage are static, the images during the concrete operational stage are anticipatory and envisage change as well as results.[46] The images thus become a better base for the developing structures.[47]

[42]Piaget and Inhelder, Psychology of the Child, 79

[43]ibid, 71

[44]Piaget, Growth of Logical Thinking, 246

[45]Piaget and Inhelder, op. cit., 110

[46]ibid, 71

[47]ibid, 79

The child becomes capable of certain logic. Reversibility of operations is understood but the logic is based on real objects.[48] There is a representative evocation of objects or events not present through deferred imitation, symbolic play, drawing and verbal evocation which is based on the development of language.[49] The overall cognitive structures are present but they are weak and permit only step by step reasoning.[50] Operations must relate directly to objects and not verbally to a stated hypothesis.[51] This stage represents the transition between schemes of action and the general logical structures of formal operations.[52]

At the concrete operations stage, correlations between types of equilibria are unstable although each type of equilibrium by itself may be stable.[53] This stage is not a very great extension of the empirical situations.[54] The understanding of some factors such as "weight" lags behind others such as "length" because it is difficult to dissociate some concepts from one's own actions.[55] Thought cannot be immediately generalized to all physical properties.[56]

[48] Piaget, Child and Reality, 21

[49] Piaget and Inhelder op. cit., 53

[50] ibid, 100

[51] ibid

[52] ibid

[53] Piaget, Growth of Logical Thinking, 250

[54] ibid, 250

[55] ibid, 249

[56] ibid

The stage is characterised by an extension of actual phenomena in the direction of potential but with only a nascent comprehension of this movement.[57]

The stage of formal operations is characterised by the dominance of possibility over reality. The set of given facts is now seen as the sector of the set of possible transformations that have actually come about and the facts are not accepted until they are verified.[58] This stage is essentially hypothetico-deductive, characterised by propositions or postulations of facts independent of whether they really exist. Assumptions may be linked together and consequences identified when validity may be possible to check.[59] In contrast to the concrete stage which starts with the empirical and proceeds towards the hypothetical, this stage reverses the direction and ends up at the empirical.[60] Relations may now be ordered only verbally whereas at the concrete stage referents for relations needed to be concrete.[61]

The adolescent can begin to analyse his own theories.[62]

[57] ibid, 248

[58] ibid, 250

[59] ibid, 251

[60] ibid

[61] ibid, 252

[62] ibid, 340

The formal stage marks a more distinct differentiation between personal viewpoint and external reality which was not previously possible due to the dominant force of egocentrism.[63] The individual during this period is continually refocussing his perspectives due to increasing knowledge while objectivity due to differentiation and co-ordination of multiple perspectives is increasing.[64] The adolescent can become committed to possibilities because he can build systems and theories to think beyond the present.[65] These changes are the result of the interaction of forms of intelligence and social formal structures mediated by the individual's experience.[66]

It is interesting at this point to notice a study which was completed prior to the Piagetian revolution yet reflects his developmental stages very accurately. The study analysed the growth of concept development in children and identified five stages. The pre-abstract stage prior to eighteen months was characterised by discrimination and generalisation but was not linguistic. At about eighteen months the first linguistic discriminations are made. At twenty-six months the first simple genus species relationships are made such as orange-food.

[63] ibid, 343

[64] ibid, 345

[65] ibid, 339

[66] ibid, 338

At about four and one half years the hierarchy is perceived on three levels such as food-vegetable-potato and at the final level the child can grasp up to a nine step hierarchy.[67] The hierarchical organisation is due to repeated classification and increased generalisation in concepts.[68]

It is important to remember at this point a critical factor which will be subsequently dealt with in more detail later, the pervasive influence of egocentrism and the gradual socialisation of the individual from child to adulthood. Piaget concludes that there is little understanding or effective response to phenomena beyond a child's empirical experience.[69] Such concepts as "nationalism," "social justice" and "humanity" are difficult or impossible for children to understand. Although a baby may respond to someone socially very early in life, it is many years later before any interaction actually develops.[70] It is not until the age of thirteen to fifteen years that feelings about ideals become autonomous and not connected intrinsically with one person.[71]

[67] Welsh and Long, "A Preliminary Investigation of some aspects of the hierarchical development of concepts", 476

[68] Russel, op. cit., 242

[69] Piaget, Growth of Logical Thinking, 349

[70] Russel, op. cit., 142

[71] Piaget, Growth of Logical Thinking, 349

The developmental progression and the analysed progression in concept development also corresponds significantly with the steps in types of learning discussed previously. Early learning is unsystematic, specific and concrete, which reflects the modes of the child. Only the last three steps in the Gagne model correlate observations in a systematic and comprehensive manner. Although children certainly may not progress systematically and sequentially the learning steps do reflect, in their progression, the abilities of the child to logically organize phenomena.

Although the Piagetian scheme of development has been used extensively in clinical research and classroom experimentation there have been few attempts to create a description of concept learning based on his conclusions. Klausmeier and others at the University of Wisconsin centre for cognitive learning have done just that. The conceptual learning and development model accepts Piaget's view of an organism-centred interactional learning and development process[72] and postulates qualitative, not merely additive, differences at successive levels of concept attainment.[73] It does not attempt to explain differences on a biological or physiological level and is neutral in respect to the global operations of equilibrium assimilation and accommodation with more emphasis upon environmental factors.

[72]Klausmeier, Ghatala and Frayer, op. cit., 8

[73]ibid

[74]ibid

For learning at successively higher levels it bears similarity to Piaget's description of concept development.[75] For short time interval learning, it bears resemblance to concept learning theories developed by American experimental psychologists.[76]

Performance at the concrete level is inferred when the individual recognises an object which has been encountered on a prior occasion which, according to Gagne, depends upon attending to an object and discriminating it from other objects.[77]

Performance at the identity level is inferred when the child can identify objects as the same one previously encountered from another perspective which involves identifying the various forms of the same object and generalising them as equivalent.[78]

Performance at the classificatory level is inferred when the individual treats two instances of the same class of things as equivalent although they may or may not be able to describe the basis for making that response.[79] Performance at the formal level is inferred when the individual can give the name of the concept and name its intrinsic or societally accepted attribute. He can accurately designate instances as

[75] ibid, 2

[76] ibid

[77] ibid, 16

[78] ibid

[79] ibid, 18

belonging or not belonging to the set or class and he can state the basis for inclusion or exclusion of an instance on the basis of its defining attributes.[80]

Although no model for concept development can comprehensively analyse and structure the area, this one offers several strong elements. It is based on current research and philosophy. It offers an initial conception of levels and progressions. It is couched in behavioral terms and it includes the extension and application possible at each level of performance. There are, however, some drawbacks. The behavioral terms are very global and need to be analysed into smaller steps while maintaining the logic and philosophical base of the system. Some steps seem to suddenly incorporate more skills than the previous step without much previous development. The stages seem to apply easily to concrete referents such as mathematical and scientific concepts and less easily to semi-abstract or totally abstract referents such as social science concepts. Nevertheless, a model offers a beneficial foundation because it decreases the amount of clarifying communication necessary and it can be described in more detail without completely losing its original significance. A model which represents a system is more likely to result in a clarification due to analysis and experimentation than is a vaguely connected collection of theories and generalisations.

[80] ibid

A system is always much neater and more definite without the details, restrictions and conditions which are empirically unavoidable but it is these things which make the system more meaningful by proving that it can rationally accomodate seemingly diverse observations and conclusions.

Factors Influencing Concept Development

One of the most pervasive influences on the development of rational concepts is egocentrism. The self centred perspective prevents the development of logical structures by justification and stimulates the development of fragmentary imaginary systems.[81] Only between the ages of seven and eight is there the beginning of a true understanding between children.[82] Until then the explanation style is still too egocentric, characterised by elliptical style, indeterminate pronouns, lack of order and juxtaposition of ideas.[83] Pre-causality disappears at the same age as egocentrism since a casual explanation is an attempt to adopt oneself to the external world, to objectify and depersonalise thoughts. Without this effort the mind projects intentions into everything and nothing is seen as fortuitous.[84]

Piaget has seen the characteristics of egocentrism in concept understanding as being so numerous, distinctive and popular that he has labelled them the process of syncretism. Syncretism is a subjective synthesis of ideas since an objective synthesis presupposes analysis.[85]

[81] Piaget, Language and Thought of The Child, 238

[82] ibid, 124

[83] ibid

[84] ibid, 237

[85] ibid, 140

Since egocentric childish thought connects all occurrences with no place for chance the child will invent connections as best he can.[86] It is a wide and comprehensive but obscure and inaccurate intellectual activity where no distinctions are made and things are heaped one upon another.[87] In concluding, analysis is richer and more confused than adult general schemas.[88] Under the influence of egocentrism, the child listens and believes that he understands everything. He doesn't ask for clarification but rather he assimilates any unknown words into his general schema.[89] The apparition of a whole general schema may be released by a partial analogy between known ideas and new ideas.[90] The child will ignore unknown words to produce a schema of explanation which in turn interprets or digests unknown words.[91]

Syncretism seems to follow in the development of language from using words and sentences to an analysis of their meaning.[92]

[86] ibid, 150

[87] ibid, 132

[88] ibid

[89] ibid 151

90ibid, 143

[91] ibid, 152

[92] ibid, 154

Piaget identifies two main types of syncretism: reason and understanding. Syncretism of understanding refers to the verbal distortion of a proposition into a general schema which actually contradicts the meaning of the initial proposition.[93] In a syncretism of reason, processes or propositions are linked not by logical analysis but by some general schema which connects the two in an indistinct and general manner.[94]

Piaget sees two possible explanations to explain the process of syncretism. The child may argue from the resemblance of two elements taken from two objects and correspond other elements term by term[95] or a given proposition might induce a schema based on the symbolic meaning, mental imagery, sentence rhythm and word position. This new schema is used to assimilate and digest another proposition which in turn generates a schema which digests the initial proposition[96]

Piaget sees the process of syncretism as the focussing upon only part of a proposition and adding corrolaries to each proposition which corresponds even though the main propositions do not.[97]

[93] ibid, 139

[94] ibid, 134

[95] ibid, 142

[96] ibid

[97] ibid, 138

It is interesting to note that Bruner has observed the same type of process in experimental situations in which adults are learning propositions. Once the attributes of the concept have been established the subjects tend to fill in missing attributes on subsequent examples even if they are not there.[98] Even though syncretism seems to be largely overcome with maturity, there are traces of its influence left even at an adult level.

Rather than identify obstructions to concept learning, other writers have attempted to identify the skills required to ensure concept learning. Gagne classifies these skills as internal and external. Internal skills involve a set of verbal chains previously applied to representative stimulus situations involving the concept and the development of the skill of multiple discrimination. The external requirements involve facilitating instructional skills such as the close presentation of examples, focussing instructions, reinforcement of a correct response and the presentation of several additional examples to ensure attainment.[99] In keeping with his outlined hierarchy of learning types he emhpasises the critical importance of concrete examples which must be referable to actual stimulus situations.[100]

Attending to a situation and discrimination are critical factors involved in the development of rational concepts.

[98] Bruner, op. cit., 47

[99] Gagne, Conditions of Learning, 134

[100] ibid, 132

The child must be able to recognise the concept as being the same despite certain irrelevant changes in orientation or in the method of sensing the concept.[101] Attention and discrimination may be based on a bundle of properties which make a thing different from other things.[102] The features of an object used to discriminate it depends on the other objects from which it must be discriminated.[103]

Bruner has outlined several influences on concept attainment at an adult level but these could apply to children also. The individual's idea about what degree of accuracy constitutes an adequate solution will influence concept achievement as well as the depth of understanding of a concept which depends on previous related knowledge and verbal level.[104] Concept attainment will vary with the subject's anticipated consequences of achieving the concept.[105] If there is a conscious seeking of the concept definition results will be better.[106] Bruner found that subjects have a tendency to look for a certain type of concept in an experimental situation and to continue to look for certain attributes once they have been identified in one example.[107]

[101] Klausmeier, Ghatala and Frayer op. cit., 32

[102] Gibson, Principles of Concept Learning and Development, 82

[103] Klausmeier, Ghatala and Frayer op. cit., 32

[104] Bruner, op. cit., 59

[105] ibid, 78

[106] ibid, 57

[107] ibid

If either of these is not adjusted according to feedback experience, concept development will be retarded. This is particularly evident in reference to the opportunities to validate a concept. If opportunity to check the meaning of a concept are infrequent, individuals continue to use invalid definitions.[108]

Bruner defines the aim of concept learning as the identification of a set of strategies with maximum rationality stated in strict logical terms.[109] Many of the factors previously discussed are subjective factors which change with the age of the child. In addition there are many objective factors which influence concept attainment no matter what the age of the individual. The number of attribute values increases the complexity of the learning task by increasing the possible number of combinations involved.[110] The manner and order of encountering concept examples and example frequency influence attainment.[111] Whether the examples are positive or negative also influences concept attainment,[112] as does the number of possible examples. There are many examples of airplanes but only one example of a moon,[113] while such concepts as eternity have no perceptible instances.[114]

[108] ibid, 67

[109] ibid, 55

[110] ibid, 65

[111] ibid, 69

[112] ibid

[113] Klausmeier, Ghatala and Frayer op. cit., 11

[114] ibid

Although positive examples aid in concept attainment, positive redundant information slows down the speed of concept learning.[115] Negative redundant information produces the same result.[116]

One critical development factor is the child's ability to analyse stimulus configurations into abstract dimensions or attributes. This ability develops with age.[117] As age increases, there is an increasing reference to attributes to sort things out.[118] With increasing age, the child can also identify less obvious attributes of concept instances[119] but when attributes are vague or ambiguous for the individual, there is a greater reliance on group concensus to identify them.[120] The older the child the more abstract the definition of the concept that he gives.[121] The older the child the more highly developed is the skill in exhaustive sorting.[122]

Learning concepts inductively also involves the child's skill in problem solving. The Bruner definition mentioned

[115]Bulgara and Archer "Concept identification of auditory stimuli as a function of amount of relevant and irrelevant information", 256

[116]Bourne, Guy, Dodd, Justen, "Concept identification: The effects of varying length and information components of the intertreal interval", 628

[117]Klausmeier, Ghatala, Frayer, op. cit., 19

[118]Wiviot, "Basis of classification of geometric concepts used by children of varying characteristics", 10

[119]Klausmeier, Ghatala, Frayer, op. cit., 9

[120]Bruner, op. cit., 76

[121]Russel and Saadeh, "Qualificative levels of children's vocabularies", 197

[122]Klausmeier, Ghatala and Frayer, op. cit., 185

previously emphasises this component in the area of problem solving. Thus it is also possible to observe and analyse children's attainment of concepts acquired inductively by the use of the problem solving method.[123] Through experimental observation two approaches to analysing concepts inductively have been identified. In one approach, the learner guesses the possible attribute or combination of attributes and then checks his guess or hypothesis against positive and negative examples of the concept. In the other approach, the learner notes commonalities in the examples of the concept. This approach requires that positive examples of the concept be used.[124] Once the hypothesis has been formulated it is verified for consistency concensus, affective congruence and/or congruence with an ultimate criterion.[125] After the concept has been rectified by repeated application it is maintained in two ways: either by the formation of a typical instance or of a generic instance which emphasises the idealised values of the attribute with no noisy attributes.[126] Concept attainment may be tested directly by identifying an example of the concept or indirectly by identifying non-examples of a concept.[127]

Most concepts are learned deductively from definitions.[128]

[123]Bruner, op. cit., 55

[124]Klausmeier, Ghatala and Frayer,op. cit., 19

[125]ibid, 20

[126]Bruner, op. cit., 64

[127]ibid, 71

[128]Ausubel, op. cit., 165

This requires the assimilation of new content and its relation to established ideas which depend upon the criterial attributes of the concept.[129] The learner's relevant ideas must be available, stable, clear and discriminable.[130]

Deductive instructional concept learning may be influenced by the selection and ordering of concepts, instructions to the learner, the use of experimentally verified principles of concept learning, the use of concepts with wide explanatory power, and ordering the sequence of presentations.[131] Orienting instructions help the child in relation to gross and fine sense orientation.[132] The use of rational sets of examples and non-examples, emphasis of relevant attributes, teaching a strategy for analysing concepts, learner feedback and active learner involvement also influence concept learning.[133]

The experimenter and/or the teacher cannot manipulate concept learning directly. They present stimuli which induce representational responses which may have a meaning for the subject which may be identified as the concept.[134] Archer defines concept learning as a remote control system with a great deal of slack in the geartrain.[135]

[129] ibid, 169

[130] ibid

[131] ibid

[132] Klausmeier and Meinke, "Concept Attainment as a function of instructions concerning the Stimulus Material", 221

[133] McMurray, Bernard and Klausmeier "An Instructional Design for Accelerating Children's Concept Learning", 2

[134] Archer, op. cit., 48

[135] ibid

This does not nullify the application of valid learning principles in a consistent and conscientious manner; it only emphasises the permanent existence of chance and personal differences in concept learning.

Verbal instructions may improve understanding by performing two essential functions: explaining unfamiliar terminology and directing observation.[136] Verbal instructions provide the learner with advanved organizers[137] so he achieves the same goal as the inductive learner.[138]

Although logical analysis in concept learning increases with age,[139] the learning method at any age may be analytical or global. Analytical learners categorize observations. Global learners also categorize but on a relatively undifferentiated stimulus.[140] Analytical learners show better achievement on complex concepts in relation to time, number of trials required and errors of exclusion.[141] Experimental attempts to teach analysis to global learners are contradictory. One concluded that it made no difference[142] while Adams concluded that it did.[143] Wiviot found that analytical ability

[136]Klausmeier, Ghatala and Frayer op. cit., 117

[137]Schultz, "Role of cognitive organisers in the facilitation of concept learning in elementary school science", 126

[138]Trabasso, Rollens, Shaunessy, "storage and verification stages in processing concepts", 288

[139]Klausmeier, Ghatala and Frayer, op. cit., 45

[140]Kagan, Moss and Sigel "Significance of styles of conceptualisation", 110

[141]Klausmeier, Ghatala and Frayer, op. cit., 42

[142]ibid, 46-50

[143]Adams, "Learning to learn on a concept attainment task as a function of age and socio-economic level", 3

is related to social class[144] but a later replication refuted this.[145] The only point of agreement seems to be that analytical ability increases with age and may be used to differentiate children at one age level based on achievement on spicified tasks.

The relationship of language and concept learning is only partially defined. Piaget said the relationship of developmental stages and language is correlative not simply casual.[146] The relationship of language and formal structures is not known exactly.[147] Language itself cannot give the child operatory structures unless they have been reached in concrete and symbolic form.[148]

Klausmeier's progression on language acquisition directly reflects Piaget's stages. First the child associates the word with the object. Secondly, the word becomes associated with the child's abstracted idea of the image. Thirdly, the word becomes associated with the whole class of objects. Finally, the child identifies the attributes of the particular image.[149]

[144]Wiviot, "Basis of classification of geometric concepts used by children of varying characteristics", 7

[145]Nelson, "A study of classificatory behaviour in low socio-economic children of varying characteristics", 7

[146]Piaget, Child and Reality, 117

[147]ibid, 120

[148]ibid, 118

[149]Klausmeier, Ghatala and Frayer, op. cit., 123

This sequence is illustrated in children's analysis of nonsense words in sentences. Younger children derive a meaning for the word based on the first encountered instance and alter all subsequent examples to fit the initial meaning. Older children modify the meaning of the same word in several examples in order to fit all of them.[150]

Language and concept learning are positively related. Words are societally accepted definitions of a concept.[151] Many vocabulary tests test for recognition of a concept.[152] and many experiments identify a positive correlation between vocabulary and concept attainment.[153] Verbal cues make concept attainment more efficient.[154] Verbal ability will influence the speed and the method of learning concepts.[155]

Language significance increases as the child develops as a social being. The explainer wants to make the explanation more truthful.[156] Communication necessitates a more objective analysis of ideas. The congruence of personal and societal definitions increases.

[150]ibid, 148

[151]Carroll, "Words Meaning and Concept", 179

[152]Russel, Children's Thinking, 122

[153]Klausmeier, Sipple and Allen, op. cit., 40

[154]Gagne, Conditions of Learning, 131

[155]Glasser, op. cit., 23

[156]Piaget, Language and Thought of The Child, 124

Social concepts are the result of a child's self concept and his social experience.[157] They are determined early at home and later within his peer group. The teaching of social concepts as ideals does not seem to have a major impact upon the child's social concepts.[158] Improved language changes social percepts to concepts reflected in concrete classification with friends and later to labelling and the development of prejudices.[159]

Wesley and Adams identified a hierarchy of social concepts from simple to complex.[160] Children first attain concepts about things, places, persons and actions. Next they learn concepts about occurences and events in places. They then learn concepts about relations among people and between man and nature. Following this they learn concepts of time and space and relationships between individuals and groups. This is followed by the development of personal and social codes, standards and ideals. Relationships among groups are defined next and finally relationships between society and groups.

This hierarchy represents a gradual progression from egocentric to socially conscious concepts which is congruent with Piaget's developmental outline. It also correlates with Klausmeier's outline of language acquisition in that it becomes more abstract and more class conscious as it progresses

[157] Russel, op. cit., 141
[158] ibid, 142
[159] ibid, 143
[160] ibid, 146

It is significant not in its accuracy but in its intent to seriate types of social concept based on age of acquisition. It represents a mandatory component for analysis and evaluation of social science concepts.

Two studies in particular seem to agree with the hierarchy of social concepts. One study investigated the type of concept most frequently and accurately understood by children. The study concluded that the types of social concepts understood best were those on crime and health followed by those on economics and government followed by socio-ethical and war-peace concepts.[161] The same study also found a positive correlation between knowledge of social concepts and grade level.[162] Both conclusions support, with reservations, the significance of a hierarchy of social concept learning.

The other study investigated the development of social concepts in primary school children. This study concluded that concepts involving interpersonal relations were not as well defined as those involving factual information.[163] This conclusion supports the social concept hierarchy directly. The same study also found that understanding was a function of concrete experience. Few children could identify examples of abstract concepts such as nationalism and good citizenship.[164]

[161] ibid, 144

[162] ibid

[163] Lacey, Social Studies Concepts in the first three grades, 136

[164] ibid

One of the most critical reviews of concept research was done by Glasser. Although he tends to be vehement and dogmatic in his judgment, it is not difficult to find examples of his criticisms in concept research. He criticised the experimental research itself, pointed out the exclusion of critical components and gave examples of the irrelevancy of some concept research. He criticised experimental research for the narrow domain of subject matter which was investigated and for the lack of analysis of the nature of competence in many conceptual tasks. The rigidity of experimental procedures and the neglect of individual differences has kept the field less relevant than it could be.[165] It is obvious that mathematical concepts are much more popular for research than social science concepts. In too many instances research in the development of language and concepts reaches specific conclusions but has no larger framework to which to relate.

Experimentation tends to avoid concepts with flexible boundaries or with a variation in perceptibility. Concepts of a rational character are also avoided in research.[166] Inductive concepts are emphasised.[167] Concepts based on a hierarchy of previously learned concepts have not been sufficiently investigated.[168] Concepts which involve the acquisition of a strategy to de-emphasise the role of memory should be analysed more intensively and more frequently.[169]

[165]Glasser, op. cit., 38

[166]ibid, 29

[167]ibid, 25

[168]ibid

[169]ibid

Experimental research does not emphasise the same types of concept learnings that are commonly found in classrooms. Classroom learning is largely deductive; experimental learning is inductive. Classroom learning emphasises relational concepts; experimental learning emphasises conjunctive and disjunctive concepts.[170] Classroom learning depends upon a network of pre-requisite concepts; experimental learning emphasises the identification of attributes from factual data.[171]

The state of experimental research seems to reflect Bruner's observation concerning concept learning. He said that North American people have a predeliction for conjunctive concepts and have difficulty with relational concepts. This is reflected in the decision to experimentally examine conjunctive concepts. They are the predeliction not only of learners but also of experimenters. Not only are they favoured but they are also learned with more accuracy,[172] so they may be analysed more accurately. Inductive learning is much slower and constantly needs refining. Many school concepts are based on previous concepts rather than on data analysis due simply to the requirements of time and expected levels of precision in achievement. To teach every concept inductively would be to relive history stage by stage.

The emphasis upon the intellectual development of concepts has been partially responsible for an underestimation of the role of individual differences. When experimenters use group

[170] ibid, 22

[171] ibid

[172] Bourne and O'Banion, "Concept rule learning and chronological age", 533

scores they de-emphasise the differences in score which may be the most significant factor.[173] If the correlational coefficients for all studies of concept and intelligence or anxiety were totalled the coefficients might be 0 because of the wide variation among individual studies which were caused by under-estimating the importance of other individual variables.[174] More experiments should correlate concept learning with intrinsic individual differences which exist in the process of learning.[175]

Bruner's experiments and description of concept learning reflect the preoccupation with the intellectual strategies involved. Many of his exemplary descriptions focus on complex adult learning or on very simple child learning with nothing in between. Bruner's definition of the goal of concept learning, i.e., identification of a rational strategy, does not seem to be a goal which an individual would consciously formulate but rather one on which an experimenter would focus. Bruner emphasises concept analysis but spends comparatively little time correlating his findings with other factors such as age or ability. A highly theoretical approach may be consistent with improving concept learning if it is used as the basis of experimentation but many experiments, although they acknowledge Bruner's basic ideas, develop their own eclectic rationale and do not directly reflect his ideas.

[173] Jensen, "Individual Differences in Concept Learning", 144

[174] ibid, 149

[175] ibid

Although Gagne's learning types have many beneficial aspects, they emphasize behaviorist type learnings in which stimulus response chains are more definable. The transition from concept learning to problem solving is rapid in comparison to the finer progressions described at the beginning of his hierarchy. His definition of the term "concept" was a synthesis of several prominent definitions rather than an inductive statement which reflects his interest in thought development preceding concept formation.

Klausmeier's concept learning model is rich in possibilities for concept research and has been carefully founded upon Piagetian philosophy and experimental research. Nevertheless, the research emerging from use of the model exemplifies Glasser's critism of the field. It emphasises simple concrete concepts and is extremely structured in technique. The conclusions seem sound but their application is unexplained.

Perhaps, the most difficult writer to critise is Piaget because his work has had such high impact on learning theory and education. His theories are so comprehensive and exhaustive that his work is comparable to the effect that the relatively theory had. Nevertheless, his work may be critically evaluated without detracting from its significance. There are some concerns about the way he collects data, the way he treats it and the applicability of some of his conclusions. His observations in many cases were made on a small sample. The insight that he gains from a few experiments is astounding considering the low number of subjects.

Piaget tends not to identify individual differences closely in his experiments.[176] and he most frequently treats his observations descriptively rather than statistically.[177] In comparison to many doctoral dissertations,Piaget hardly makes reference to statistics. Many experimenters find that his classifications are very narrow and thus difficult to apply exactly, such as his definition of adapted information.[178] Other experiments have found reasoning ability much earlier than he predicted, and lower percentages of egocentric thought.[179] Some of these criticisms may be unwarranted because he has produced a philosophical structure for viewing child development whereas some others who may never be critised for experimental methods produce conclusions of questionable significance. In relation to the emphasis on stages, Piaget emphasised that the times were approximate and only the sequence was rigid.

Summary

Concepts represent a classification of data in order to reduce environmental complexity and minimise new learning. Concepts represent a combination of specifiable characteristics called attributes each of which has a specific value range. Concepts may be classified as conjunctive, disjunctive or relational depending upon the relationship of attributes.

[176] Russel, op. cit., 161

[177] ibid

[178] ibid, 160

[179] ibid, 161

Concepts may be learned inductively or deductively. Inductive learning requires the use of a problem solving strategy to attain a definition. Deductive learning involves the careful analysis of the content to be learned and the use of specific instructional techniques to attain a definition. Whether the concept has been learned inductively or deductively, attributes must be corresponded to new examples to evaluate inclusion in the specific class the concept represents. Concepts are organised hierarchically into an interlocking system achieving greater generality and broader application in a vertical seriation and in a horizontal seriation.

Learners are able to analyse new concepts with increasing expertise as they get older but at any given age level some learners have more analytical ability than others. Language development is closely related to analytical ability as is the progressive change from egocentric to social consciousness.

Although the relevance of a great deal of concept research must be determined by the individual, it is beneficial in improving education by improving understanding of learning and instruction. Such products as the concept learning model are beneficial because they draw together a great deal of diverse theory and conclusions to produce an intermediary step between laboratory and classroom.

It is perhaps more important to investigate concepts in the area of social science as opposed to mathematics because social science content depends more on the development and use of abstract ideas and has fewer concrete referents of an individual type. The end result of the development of social science concepts is as important as the development of math

concepts for, although many life aspects depend upon an understanding of mathematical concepts, many also depend upon social concepts. Personal interaction, group dynamics and government depend upon the existence of logical valid social concepts. These concepts should not be taught vaguely and without order. They should be taught systematically and progressively to help produce a mature citizen who understands his environment in many dimensions.

CHAPTER THREE

THE PROCEDURES

Concepts are ways of classifying data. Facts are organized into concepts on the basis of attributes or common groups of facts which always occur together. Concept attributes occur in different relationships resulting in three different kinds of concepts: conjunctive, disjunctive and relational. Conjunctive concepts are ones in which all the defining attributes are present simultaneously. In the concept "green balls," the defining attributes of colour or form must be present simultaneously. Disjunctive concepts are ones in which the appropriate values of one attribute or another or both are present. In the concept "a walk" from baseball, the attributes are either the result of four pitches classed as balls or a pitch which hits the batter. Relational concepts are ones in which there is a specifiable relationship between attributes. The concept "distance" defines a specifiable relationship between two points.

Concepts may be organized not only on the basis of the relationships among attributes but also on the basis of relationships among concepts. Supraordinate concepts are ones which include other concepts as their defining attributes. Co-ordinate concepts are ones which are synonymous with other concepts based on a similarity in concept attributes. Sub-ordinate concepts are ones in which the concept forms attributes in another concept.

TABLE 1

Analysis of common concepts

A Types of Concepts

conjunctive	disjunctive	relational
environmental	culture	interdependence
institutions	traditions	
province	heritage	
government		

B Classification of concept

supraordinate	co-ordinate	subordinate
culture	province	
interdependence		
environment		
institutions		
government		
tradition		
heritage		

TABLE 2

A list of concepts specifically mentioned in the ministry of education documents.

A Concepts in the Formative Years

concept	page reference
group	22
rights	22
rule of law	22
customs	22
institutions	22

B Concept in education in the primary junior devision

Concept	page reference
community	102
conflict	96
culture	56&96
interdependence	96
natural environment	22
province	23
law	23
government	23
historical roots	23

C Concept in intermediate history guidelines

Concept	page reference
justice	
change	
diversity	
order	
individualism	
common good	4
worth of the individual	
concern for others	
dignity of labour	
tradition	
culture	
heritage	

D Concept in intermediate geography guidelines

Concepts	page reference
community	
province	
country	
environnment	
settlement	3
value	
culture	
social organizations	
economic systems	
political structures	
interdependence	

TABLE 3

Concepts referred to in both primary, junior and intermediate documents

Concept	documents origin
community	P/J G2
culture	P/J G, H3
interdependence	P/J G
environment	P/J G
institutions	P/J G4
province	P/J G
government	P/J G
historical roots	P/J H5

1 P/J represents the formative years and education in the primary and junior divisions.

2 G represents the intermediate geopraphy guidelines

3 H represents the intermediate history guidelines

4 The geography guidelines refer to social organizations which I consider synonymous with institutions

5 The history guideline refers to tradition and heritage which I consider synonymous with historical roots

In both the primary/junior and intermediate grade level documents for the Ontario Ministry of Education, concepts are specifically mentioned and knowledge of specific concepts is identified. In order that this emphasis on concept learning be beneficial, it should be developmental both logically and psychologically. Logically it should be organized to achieve supraordinate concepts by developing a cumulative progression of subordinate concepts. Psychologically, it should be organized to correlate the child's mental capability with the type of concept and the degree of mastery of the concept.

In accordance with the proposed philosophy and preferred methodology in the primary/junior documents, concepts at this level should be developed with a strong emphasis on manipulatable attributes and on a correlation to the child's immediate environment. Concepts must be concrete and local.

In identifying and analysing the concepts selected for emphasis in the primary/junior division, it is apparent that the concept classification of conjunctive, disjunctive and relational concepts is not immediately useful in correlating the concepts and criteria mentioned above since this classification emphasises only the internal relationship of attributes and not the relationship of attributes and the kinds of facts involved. The classification of concepts into supraordinate, co-ordinate and subordinate relationships is somewhat more useful since it identifies a developmental pattern in terms of logic only. A specific concept cannot be mastered efficiently unless another concept which forms an attribute is understood. Although more helpful, the

classification method is still not completely adequate for evaluating the placement of concepts and the development of concepts in a curriculum.

Concreteness and immediacy are emphatic priorities in relation to the ministry documents and the psychological capabilities of early childhood. These two characteristics may be used as the basis for criteria for concept evaluation. The most concrete concepts are ones which contain no subordinate concepts and ones in which physical forms are easily available in the immediate vicinity for manipulation and observation. As concepts become more abstract, the number of subordinate concepts involved increases and the immediacy and manipulatability of the concept decreases.

In applying these criteria to the concepts identified in the primary/junior document, it is apparent that there is a gradation in the list of concepts. Ones such as "environment" are more concrete initially and more immediate than concepts such as "culture" and "customs". In the intermediate documents for history and geography, history exceeds geography in the number of complex concepts designated. History shows a less direct, less obvious and less frequent correspondence of major concepts with the primary/junior documents and also emphasises some concepts which have a very emphatic moral component such as "dignity of labour" and "worth of the individual".

The major concepts in the primary/junior and intermediate documents are, in the majority, conjunctive and supraordinate. The latter makes a logical analysis of these concepts

mandatory in achieving widespread understanding but these concepts are neither logically analysed nor is it explained how to do this.

The concept development model provides a reasonable logical analysis of concept development which is based on the sequential mental development of the child. Since the Basic Thinking Skills share a similar philosophical and psychological base, it should be possible to correlate the two systems. The concept development model already uses some of the Basic Thinking Skills such as correlational and probabalistic thinking so it should be possible to correlate all levels of the model with the Basic Thinking Skills.

At the concrete level, the most necessary thinking skill is observation at the third level of development. This would be similar using either an inductive or deductive approach to concept learning since the emphasis is on identifying a particular feature in an object.

At the identity level the main thinking skill is, again, observation. The goal at this level is to identify two or more forms of the same thing as equivalent. Levels four, five and six in the observation skills correspond to the goal. Each level further increases the emphasis upon characteristics or attributes of the object but is not, as yet an exhaustive analysis or definition of attributes. The progression through three observation levels at the identity stage represents a gradual movement toward the goal of attribute identification and analysis.

At the classificatory stage, the appropriate thinking skill is that of correspondence at the third level. The child must now demonstrate that two examples of the concept are equivalent in some way. The one to one matching need not and may not possibly be inclusive but it must be a comparison of some characteristic or attribute from each example. This stage introduces and develops the identification of specific characteristics or attributes. (See appendix 1)

The previous stage, identity, required the identification of two or more examples of the same form of concept but without a specification of the reasons for equivalence. The classificatory stage goes one step further by beginning to analyse specified examples of the concept into attributes.

At the formal level the child at first draws tentative conclusions about the defining attributes of the concept and then tests them to determine if they are actually defining attributes. In order to draw the first tenative conclusion about the defining attributes, the child will need to achieve mastery of level two(c)of the classification skill. Level two(a)and two(b)represent an extension of a link with the correspondence skill required at the previous level of concept mastery. The child can identify those attributes which are common to two examples of the concept thereby identifying the revelant and irrelevant attributes in a pair of specific examples.

The process of hypothesising that attribute and checking the hypothesis against further examples is a necessary step because to this point the attributes have been defined only

in relation to a limited number of examples, thereby making the validity of the identified attributes questionable. The ultimate goal of concept development is to identify specific concept attributes which will have universal validity.

The hypotheses to be tested are the attributes identified in the previous examples with which the child has already dealt.

If the hypotheses are accurate they will form a subset of all the identified attributes in the new example. If they are not accurate they will form an intersection set with the new example. If the new example is a negative one the hypothesis will form either a disjoint set or an intersection set with a very low proportion of elements in the intersection.

Social Science concepts are more difficult to analyse because they are more abstract in relation to concepts in mathematics or science. Although concept learning may be systematised for deductive and inductive teaching, the experiential definition of concepts can be a time consuming frustrating effort marked by erratic progress and several cyclical movements through the model stages until a satisfactorily valid definition of a specific concept results. This has been the case in attempting to outline the attributes of specific concepts and then correlate those attributes to the concept development model. The most specific source identified, other than personal hypothesis, is based on the premise that words are socially accepted definitions of specific concepts. So the attributes of the concepts selected for analysis were taken as much as possible from dictionaries which have social value as comprehensive, acceptable sources of word meaning.

In the analysis of all three types of concepts the first two stages, concrete and identity, emphasize the observation of positive examples of the concept. At the identity stage, especially, the number of positive examples is increased and the characteristics of each example are identified although they are not analysed. The classification stage for each concept is characterised by the active identification of common characteristics among two or more examples. In identifying attributes, the student combines all identified correspondences from the previous level and defines these as the attributes of the concept. At this stage,he now identifies the boundaries of the class or concept and can determine whether or not a particular element or attribute can be included in that class or concept. Since these identified attributes are not based on an exhaustive analysis of samples they now form the hypotheses in the continuing analysis and evaluation of further examples. The more often the attributes as hypotheses are verified in relation to new examples the more valid and detailed the definition of concept attributes become.

Thus it becomes possible for the child to develop a basic knowledge of the concept and yet add to that knowledge, making it more specific and more detailed as he encounters further examples of the concept.

The concept model as developed embodies several distinct advantages. The initial emphasis upon treating the concept as concretely as possible emphasises the development of appropriate language comprehension which is a necessity for

the future development of the concept and the emphasis upon observation skills at this level counteracts the egocentric and syncretistic tendencies observed by Piaget in social rather than egocentric terms. The definition of attributes is developed on an inductive rather than deductive strategy, which conform more closely to non-directed extra school learning and depends upon a progressive extension of the child's skills, knowledge and learning capacities. The model relies on the utilization of increasingly complex thinking skills and culminates in the use of a problem solving strategy. The model reflects the emerging intellectual capabilities of the child because the stages and skills involved are closely correlated to Piaget's description of child development. The model represents a cyclical rather than purely linear development since the analysis of new examples in the final phase of the model is an evaluation of the individual's present comprehension of the concept and a revision towards a more exact comprehension of the concept.

Table four illustrates the integration of stages on the concept development model and the required Basic Thinking Skills; table five describes an instructional analysis for the concepts "environment," "government" and "heritage," using the concept development model.

TABLE 4

Correlation of the Concept Development Model and the Basic Thinking Skills

Level in Concept Development Model	Requisite Basic Thinking Skills
1 concrete	observation level 3
2 identity	observation level 4, 5 and 6
3 classificatory	correspondence level 3
4 identify attributes	classification level 2
5 hypothesising	the general problem solving model
6 inferring the concept	the general problem solving model

TABLE 5

1. An instructional sequence using the concept model

Concept "environment".

Objectives 1. Identify to learner positive example of the concept "environment",

Strategy S1 Identify immediate local of classroom bedroom as examples of environment activities focus on measurements, visual focusing and picturing

Level 2 (L2) Identity

Objectives Identify further examples of the concept

Strategy S1 Identify examples of environment of animals, other people, activities emphasize visual focusing and verbal description such as home style, geographic size and location, vegetation, temperature,number of occupants

Level 3 (L3) Classificatory

Objectives Correspond pairs of examples to identify common elements

Strategy S1 Compare examples of environments in pairs Identify common elements pictorially concretely and verbally, such as climate shelter, nearness, location, size.

Level 4 (L4)		Identify attributes of the concept
Objectives		Identify the boundaries of the concept and identify the defining attributes.
Strategy	S1	Identify all common elements identified under level three. Combine these in sets of similar characteristics. Environment may be seen as composed of physical, social intellectual and moral components.
Level 5		Identify and apply hypothesis
Objectives		Identify the attributes defined under level four as hypothesis. Correspond attributes to new examples
Strategy	S1	Identify problem question:"What are the defining attributes of the concept environment?"
	S2	Identify hypothesis as those attributes identified in level four
	S3	Use problem solving model to verify hypothesis against new examples.
Level 6		Inferring the concept
Objectives		Identify defining attributes of the concept
Strategy		Identify hypotheses which were proven consistently valid as defining attributes.

2. Objectives and strategies for acquiring the concept 'government'.

Level 1 (L1) Concrete

Objectives Identify to the learner concrete, immediate examples of rules, leaders, people with authority, representatives, groups, community problems, provincial problems, federal problems.

Strategy S1 Identify rules in the classroom and school

S2 Identify leaders in the school

S3 Identify people with authority in the school

S4 Identify representatives in the community

S5 Identify groups in the school and community

S6 Identify a community problem

S7 Identify a provincial problem

S8 Identify a federal problem

Level 2 (L2) Identity

Objectives Provide further examples of rules leaders, people with authority, representatives, groups, community, provincial and federal problems.

Strategy S1 Identify rules in the home, neighbourhood, community, country e.g., home-bed time,

T.V. time, neighbourhood-noise curfew, asking before borrowing something.

community-road safety rules, traffic signs.

Country - theft, damage

S2 Identify leaders in the community and in the province.

e.g., community - mayor, cub leader, minister, team coach, factory manager.

province - premier

country - prime minister

S3 Identify people with authority in the community, province, country.

e.g., community - judge, principle, police, mayor, coach, cub leader.

province - police, premier

country - prime minister.

S4 Identify representatives in the community and province

e.g., community - mayor, councillors, union representative team captains, class presidents, club presidents.

province - M.P.P., school board trustees, premier.

S5 Identify examples of groups in the province and community

e.g., community - unions, church clubs,

province - same as for community

S6 Identify examples of problems in the community province, nation

e.g., community - vandalism, snow removal, fire hazard
province - unemployment, energy costs, high cost of living.
Country - unemployment, energy costs, separatism falling satellites

Level (L3) Classifications

Objectives Identify common elements in examples of each subordinate concept identified in level two

Strategy S1 Identify common elements in examples of rules previously identified

e.g., Origin, subjects, duration, punishment, purpose

S2 Identify common elements in examples of leaders.

e.g., Age, job, number of subjects, length of leadership, powers, actions.

S3 Identify common elements in examples of people with authority.

e.g., Age, job, number of people controlled, duration of authority, jobs done, effects if wishes not followed, purpose, how authority is obtained.

S4 Identify common elements in examples of representatives.

e.g., Age, number of people represented, location, duration of representation, purpose, function, how position is obtained

S5 Identify common elements in examples of groups.

e.g., number of members, age of members and of group, length of time together, actions, purpose, how membership is obtained, origin of members.

S6 Identify common elements in examples of problems.

e.g., how long problem has existed, number of solutions, number of people involved in problem.

Level 4 (L4) Identify attributes

Objectives Group common elements identified in level three.

Strategy S1 Identify groups of common elements in examples of rules.

e.g., Purpose, effects if broken, duration, origin.

S2 Group common elements in examples of leaders.

e.g., Method of gaining position, function.

S3 Group common elements in example of people with authority.

e.g., Actions, results if instructions are not followed, how authority is obtained.

S4 Group common elements in examples of representatives.

e.g., How position is obtained, actions purpose of job.

S5 Group common elements in examples of groups

e.g., Actions, purpose

S6 Group common elements in examples of problems

e.g., Number of solutions.

Level 5 (L5) Identify and test hypothesis

Objectives Apply the identified attribute to new examples and verify their validity.

Strategy S1 Identify positive examples of the concept

S2 Correspond hypotheses and elements in each example.

Level 6 (L6) Infer the concepts

Objectives Identify those hypotheses which have been validated as the defining attributes of the concept.

Strategy S1 Identify criteria for acceptable validation of hypotheses.

S2 Identify hypotheses which meet criteria

S3 Label accepted hypotheses as defining attribute

3. Objectives and strategies for acquiring the concept heritage

Level 1 (L1) Concrete

Objectives Identify examples of the concepts

Strategy S1 Identify positive examples of the concept "heritage".

e.g., Objects - watch, dishes
Property and/or business - farm, store.
Ideas - equality, racism.

Level 2 (L2) Identity

Objectives Identify further positive examples of the concept.

Strategy S1 Identify and describe positive examples of the concept heritage.

e.g., objects - pictures, furniture, tableware, instruments, tools
property and/or business - residence, farm store, factory
ideas - religious beliefs, law, principles of social intercourse (specific examples)

Level 3 (L3) Classification

Objectives Identify common elements in examples

Strategy S1 compare characteristics in sets of examples and identify similar characteristics.

e.g., objects - age, previous ownership, present ownership, social importance.
property and/or business - age, previous and present ownership, social importance legal support for ownership.
ideas - social importance, type (religious, legal,social behaviour benefit).

Level 4 (L4) Identify attributes

Objectives Group common elements identified in level three

Strategy S1 Identify groups of common elements in the examples of heritage.

e.g., objects - previous ownership, present ownership age, social importance use.
property and/or business - previous and present ownership, age, social importance, legal support for ownership.
ideas - type (religious, legal, behavioural and detrimental effects, gifts and problems.

Level 5 (L5) Identify and apply hypothesis

Objectives Apply identified attributes to new examples and verify their validity

Strategy S1 Identify positive examples of the concept

S2 Correspond hypotheses and elements in each example.

Level 6 (L6) Infer the concept

Objectives Identify those hypotheses which have been validated as the defining attributes of the concept.

Strategy S1 Identify criteria for acceptable validation of hypotheses.

S2 Identify hypotheses which meet criteria.

S3 Label accepted hypotheses as defining attributes.

TABLE 6

Concept level attainment related to school division concept "Environment"

Attributes	Primary	Junior	Intermediate
environment	L1	L2 L3	L4

concept level attained related to school division concept "government"

Attributes	Primary	Junior	Intermediate
rules	L1	L2 L3	L4
leaders	L1	L2 L3	L4
authority		L1 L2	L3 L4
representatives		L1	L2 L3 L4
groups		L1 L2	L3 L4
problems			
community		L1 L2	L3 L4
Province			L1 L2 L3 L4
nation			L1 L2 L3 L4

concept level attainment related to school division concept "heritage

attributes	Primary	Junior	Intermediate
objects	L1	L2 L3	L4
property		L1 L2	L3 L4
business			
ideas		L1	L2 L3 L4

Major hypothesis

An analysis of the test scores from the questionnaire will produce a positive significant correlation between age and test scores.

Minor hypotheses

1. Because concept level being tested becomes more complex, there will be a depression of scores on each successive level of the test.

2. As the concept level being tested increases in complexity the older subjects will make more correct responses than the younger ones.

3. Scores will be higher for each subject on the first and second level of concept development than on the third and fourth level.

4. Scores for each subject will be higher on the concept "environment" than on the concept "government" and "heritage"

B. Types of concepts

Each of the three concepts being tested represents a class or category. The concept "environment" represents a class of concepts which may be formed by evaluating the immediate, concrete data. In this type of concept, observation and manipulation of data is easy to achieve. The concept "government" represents a class of concepts in which the immediate and concrete data is organized into subconcepts. Most subconcepts continue to have a concrete experiential base but many subconcepts are less immediate (such as "representative"). The concept "heritage" represents a class

of concepts in which the defining attributes are less immediate and less concrete than the previous concept classes. Instances of legality and obligation may be identified in the immediate environment but the process of attaining the concept is emphatically deductive. When this class of concept is learned inductively, it is the most time consuming to achieve mastery at the formal level.

C. Basic criteria for developing the survey

1. Format

A multiple choice format has been selected for two reasons: objectivity and projected utility. An essay type format would produce many variations and complicate comparative analysis. A true-false type format would severely limit the variations in response and the scope of any comparative analysis. The multiple choice format represents a compromise of extremes. By its nature, it can generate any number of alternatives and yet limits all respondents to only the given alternatives so that a comparative analysis is possible. It is objective in the sense that everyone must choose from the same list of alternatives. It is subjective in the sense that the instrument developers determine which alternatives are included and which are excluded.

2. Sampling Procedure

The complete questionnaire will be distributed to selected classes in Bramalea, specifically in the Bramalea-Chinguacousy family of schools. The questionnaire will be completed by all the children in the selected classes. From this list of completed questionnaires random samples will

be selected for each class for analysis. The remaining questionnaire forms will be retained until the completion of the study at which time they will be destroyed.

3. People in the sample

All of the sample subjects are elementary school pupils in Bramalea. They are enrolled in grades three, five and eight.

4. The kinds of data sought

Each subject will respond to a series of questions on three specific concepts written in a multiple choice format. Each subject will respond to every question in the survey. In addition to this, each subject will identify his/her birthdate.

5. What the survey must produce.

The survey must ultimately identify the correspondences described in section A: Purpose of the Survey. The survey must also identify any limitations upon the observed correspondences.

6. Rules governing the survey procedures

(a) Once the survey form has been distributed in the classroom, the teacher will read an introductory page attached to the survey describing how the questions are written and how to make a response on the survey form.

(b) Once the class has begun to answer the questionnaire no further question will be answered.

(c) If a student completes the survey ahead of the specified schedule, he will be instructed to work quietly at his desk until all survey form have been handed in.

(d) Due to the non-standardized nature of the survey form a specified time limit will be replaced by a specified percentage of completed forms. The completion time will end when 85% of the subjects in a class have submitted their questionnaire forms.

(e) The response to a specific question will be considered null if more than the specified number of responses are marked.

(f) All survey forms will be completed on the same day and, if possible, at the same time of day.

(g) All questionnaire forms will be collected and returned for analysis regardless of their state of completion.

(h) The supervising teacher will be asked to identify and separate any completed questionnaire's for which the respondents fit one or more of the following classifications.

(1) Subject is an integrated special education student.

(11) Child is receiving instruction in English as a second language.

(111) The child is an accelerated student. These survey forms will be returned to the tester but will not form part of the sample from which the random sample is selected.

7. Sample size

Ten questionnaires will be randomly selected from each class set completed. The total is thirty for each test.

8. Validity check

The validity check will consist of the consensual approval of the three professors; Dr. Popp, Dr. Wheeler and Dr. Love.

9. Data analysis

1. All selected questionnaires will be marked by me.

2. Using Spearman's rank difference square method, a coefficient of correlation will be calculated between the age rank and test rank of the students.

10. Limitations upon the conclusions.

1. The questionnaire is not standardised.

2. The questionnaire is not administered by one tester

3. The sample is drawn from a small population base.

4. The reading level of the questionnaire varies within and between concepts which will affect comprehension which will affect response accuracy.

CHAPTER FOUR

RESULTS

Conclusion

Summary observations on the questionnaire

The following table lists the correlation coefficients from the questionnaire for each section of three specific concepts. Although the coefficients vary from one subsection to another, they do indicate a significant correlation between age and scores on the questionnaire. Each subsection was completed by a sample group of students at the grade three, five and eight levels.

TABLE 7

Correlation coefficients for test score and age for each concept by concept level

Concept Level	Heritage	Environment	Government
Concrete	.73	.19	.56
Classificatory	.79	not calculated	.83
Identify attributes	.0	.73	.80

The method used to analyse the data was the rank difference square method devised by Spearman. The raw scores on the test were ranked from high to low, as were the ages of the students. The students' test rank were then compared to their age ranks. The differences in the two ranks were calculated then squared. The correlation coefficient was then calculated using the formula $rho=1-\frac{6\Sigma d^2}{n(n^2-1)}$ in which n represents the number of students who wrote the test and d represents the difference between the students' test and age rank. The specific tables listing the data are included in appendix 3.

The following table was used to gauge the significance of the coefficients achieved.

TABLE 8

Degree of significance of correlation coefficients[1]

Coefficients	Significance
.0 to .20	insignificant
.20 to .40	low significance
.40 to .60	significant
.60 up	high significance

Using this table, five coefficients may be classed as showing high significance and two may be classed as showing no significance. The coefficient for the concept "environment" at the classification level was not entered because all students at grades three, five and eight received an 0 on this section. This probably indicated a weak test question.

Of the two scores classed as showing significance, one score "environment" at the concrete level, seemed to suffer from student misinterpretation. In the concept "heritage" the attribute identification section showed a coefficient of 0.00.

In analysing the specific questions in this section it is possible to see that the question had been interpreted differently by the students than intended. The students interpreted several of the choices as defining disjoint sets whereas the choices were designed to represent union sets. Question 45[2] on the heritage test was designed to be answered correctly by selecting choices (a), (b) and (c). choices (f) and(g) were selected by many of the older students who did the test, possibly because choices (a) and (f) were seen as separate sets. Choice (a) emphasized small objects while choice (f) emphasized larger objects.

[1]McIntosh, Douglas, M., Statistics for teachers, 84

[2]see appendix 5

The intent was that they be seen as all objects but the students saw them as mutually exclusive choices based on the size of the objects.

No definite factor could be pinpointed to explain the low coefficients recorded in the environment-concrete section of the test. Several factors might possibly have influenced the results on these two tests. Misinterpretation may have been a factor here as it was on the heritage subtest. The students could have had a negative attitude towards these sections of the test, considering the subject matter too simple to merit a careful, honest answer. Since the instructions specifically stated the results would not influence their marks, the students might have paid less attention to the test. The students may have been interrupted during the completion of the test. By their own admission the teachers of the grade three classes on all subtests tended to intervene more often and explain directions and words on the questions and in the answers to the students. Because a random sample was used to score the tests, it is not impossible that a larger than normal number of students selected were of low ability in the grade eight level. The environment-classification part of the test was under-tested. There were too few choices available which meant that an error, for whatever reason, was more critical to the outcome of the test.

Conclusion Relating to Minor Hypothesis

For all of the minor hypotheses, the data provides only partial support. The first minor hypothesis predicted that as the concept level being tested became more complex, there would be a depression of scores. For the concept "environment" this was true for the grade three and five students but the grade eight students scored highest on the most complex level tested. For the concept "government" the hypothesis was true for the grade three students but the grade five and eight students scored highest on the second, more complex level of the test. Grade fives scored highest by 2.7% while grade eights scored higher by 4.75%. For the concept "heritage" the hypothesis was confirmed for the grade eight students. The grade five students achieved progressively better results showing an increase of 2% on the second level and 8% on the third level. The grade three students showed a decrease of 10% on the second level but an increase of 29% on the third level.

The second minor hypothesis predicted that as the concept level being tested increased in complexity, the older students would make more correct responses than the younger ones. For the concept "environment" the grade five students produced a superior score to the grade three students on the first and last sections. The grade eight students produced a superior score on the first and last sections.[3]

For the concept "government" the grade eights produced scores superior to the grade fives and threes and the grade fives produced scores superior to the grade threes.

[3]See appendix 4

For the concept "heritage"the grade eights achieved the highest scores on the first two sections of the test. The grade fives achieved a superior score to the grade threes on only the second level of the test.

The third minor hypothesis predicted that scores would be higher on the first and second level of the concepts tested than on the third level. For the concept "environment" this was true for the grade threes and fives. The grade eights scored highest on the third section of the test. For the concept "government"this hypothesis was true for all grades tested. For the concept "heritage" the hypothesis was true for the grade five and eight groups.

Minor hypothesis number four stated that scores would be higher for all grades on the concept "environment" than on the other two concepts. This was true for the grade threes and fives at the concrete level and for the grade eights at the attribute identification level. A complete summary of scores for each grade at each level of each concept is included as Appendix 4.

CHAPTER FIVE

SUMMARY AND CONCLUSIONS

Chapter 5

The study was undertaken to develop a system for analysing and sequencing social science concepts. Concepts are a critical organiser of content in the social science area but they often are treated vaguely in ministry and board curriculum documents. They are frequently unspecified and almost totally unanalysed. There is no apparent sequencing of concepts within or between grade levels. Closer attention to this area of the social science curriculum would result in increased efficiency in several related tasks. A specific concept analysis system would increase specificity in curriculum planning and provide a method of seriating concepts which could be applied to individual units and to curricula designed to cover several grades. By improving the efficiency and predictability of concept learnings more complex social science learning such as generalisations, theories, systems and problem solving strategies may benefit.

The system devised to analyse concepts used models developed by Bruner and Klausmeier predominantly. Bruner emphasised the categorization of concepts into three basic types: conjunctive, disjunctive and relational. Klausmeier emphasised the analysis of individual concepts into levels: concrete, identity, classification and formal. This analysis was supplemented by a further analysis of concepts into supra-ordinate, co-ordinate and subordinate categories. Supra-ordinate concepts are ones which include other specific concepts. Subordinate concepts are ones which form an attribute of a larger concept

The concept development model designed by Klausmeier

was analysed to determine which Basic Thinking Skills corresponded to each level of the model. Several concepts which illustrated the classification of concepts into supra-ordinate co-ordinate and subordinate concept classes were selected from the Ministry of Education, Ontario documents for the primary, junior and intermediate divisions. The concept analysis model was then applied to these concepts and the resulting analysis was used to develop a multiple choice student questionnaire. The questionnaire was applied to several randomly selected classes in Bramalea in Peel County in the public school system. The results from the questionnaire were used to determine whether there was a significant relationship between the age of the tested students and their score on the test. Of the eight correlations computed, five were found to be highly significant producing coefficients which ranged from .69 to .83 and one was found to be significant. The third minor hypothesis which stated that test scores would decrease on the more complex levels of understanding for each concept, received the strongest support from the test scores. The fourth minor hypothesis which stated that all students would achieve better scores on the section on the concept "environment" received the least support from the test results. Minor hypotheses two and one fell between these two in relation to the amount of support from the data. Minor hypothesis one predicted that all students scores would decrease as they encountered more difficult levels of concept analysis. Minor hypothesis two predicted that the older students would show superior achievement on the more complex levels on concept analysis.

Although the significance of language development was not specifically tested, several observations have pointed to its importance: the emphatic importance of language development in the concept development model, the unpredicted, enigmatic results in the minor hypotheses and the concept learning hierarchy described by Welsh and Long.

The varied support for the minor hypotheses indicates that concept understanding is not a simple, direct function of age but is influenced by other factors such as competency in the Basic Thinking Skills and reading comprehension. The results of the study suggest several implications for further research in three main categories: revision, re-evaluation and application.

Using the questionnaire as a field test, the test could be revised to compensate for inadequacies and reapplied to a larger number of students to determine if the correlation coefficients remain similar.

A revised questionnaire or another questionnaire based on the same concept analysis system could be applied to a group of students and the result correlated with scores from a reading achievement test on the same group of students.

A revised or rewritten questionnaire could be applied to a group of students and the results could be correlated with scores on a test of Basic Thinking Skills for the same group of students.

The concept analysis model could be applied in several ways to evaluate its validity. Children could be asked to define specific concepts either orally or in writing. Their responses could be analysed to determine at which level of the concept their comprehension is most accurate.

Teachers of several different grade levels could be asked to select specific concepts that they consider appropriate for teaching at their grade level. These concepts could then be analysed to determine what subordinate concepts are involved.

Specific social science concepts could be identified from several standardised tests. These concepts could also be analysed to determine what attributes and subordinate concepts are involved in their comprehension. The concept analysis model could be used to design and implement curriculum in social studies.

One group of students could be instructed using the concept analysis model while another group was instructed using the same concepts but without using the concept analysis model. Their final understanding of the concepts could be tested and the results compared.

Several groups of students could be instructed using the concept analysis model but eliminating or de-emphasizing a different level of the model for each group of students. Their final understanding of the concept could be tested and the results compared.

In developing a unit, the use of the concept model emphasises the identification of all the attributes of the concept. Without the definite identification of attributes some may be omitted or detrimentally de-emphasised. The complete list of attributes becomes an important part of the content or knowledge specifications and of the evaluation specifications. Using for example, the familiar concept, government, the attribute would be identified as part of the content and evaluation components.

Use of the concept analysis model also emphasizes the developmental sequential character of knowledge acquisition. Initial experience with the concept maximizes the use of concrete references and gradually becomes more abstract. The questionnaire on government attempts to illustrate this progression by emphasizing references from the child's environment and gradually changing from concrete references to more highly classified and language oriented conclusions about the concrete references.

The use of the model emphasizes experiential language development as an integral part of the unit. Through the use of observation, correspondence, classification and exhaustive sorting skills the child identifies the common elements or attributes in several examples. The language labelling of components of each example and of the common elements is a critical development in the acquisition of concept comprehension.

The use of specifiable thinking skills and of specific language clarifies the design and implementation of a unit by making the objectives very specific. Not only are the thinking skills specific but they are also sequential which means that revision and remediation within a unit becomes more specific also. If a student or students cannot use a required skill, the previous levels of that skill may be used for remediation or revision of the unit or of a lesson.

In a curriculum extending over two or more grades, the same advantages will be present as they were for an individual unit. In addition, the use of the concept analysis model will provide benefits for a larger curriculum. Attributes of some concepts may be developed at specific grades but the comprehension of all the attributes may not occur until the intermediate

or senior level. For the concept "government" certain attributes may be taught as early as the primary grades while the student is not formally taught the concept "government" until the intermediate grades.

The concept model thus makes possible a truly spiral curriculum. An attribute of a concept may be taught several times when each teaching requires a more abstract comprehension. In the concept government, the attributes of leadership may be introduced at the primary grades. At this stage the student will simply observe several identified leaders. At the next stage of development the student will describe several leaders and begin to identify the attributes of a leader. At the next level the student identifies verbally all of the attributes of a leader. The same topic may be used in several different years and have a different objective each time.

The concept model also emphasises the progression in content based on what a child is rationally and lingustically capable of comprehending rather than on an academically oriented list of content. Once the critical concepts for each level or division are identified the attributes may be specified and taught in the previous levels or divisions.

The concept model also integrates with other organizers in the curriculum. Once certain concepts are mastered, knowledge progresses to an understanding of generalizations theories and systems which are based on an adequate understanding or component concepts.

The importance of the concept model also applies to implementation. The emphasis of the model upon a concrete introduction to the concept benefits the implementation

phase both psychologically and affectively. The use of concrete referents reflects Piaget's development stages wherein formal operations are preceded by concrete operations. The usefulness of concrete references is not confined to children at the concrete operations stage. It also provides an experiential base for children who can work at the formal operations stage.

The initial concrete referents also provide an impetus to the student's affective response especially if the concept examples are within the area of the student's personal experience. The closer the integration of the concept examples and the child's personal experience, the greater will be the affective response in terms of voluntary participation and the identification of further concept examples.

A concrete experiential introduction to a concept also provides a carry-over to the more abstract levels of concept analysis in the concept model. The concept model provides a method for concept evaluation and revision after the attributes are identified. This offsets the possibility of inaccuracy in identifying attributes because of the emphasis on concrete experiential examples. The revision of attributes also emphasises to the student that knowledge is expanded as experience expands.

The concept model reflects the stages through which a rational adult proceeds in order to understand a new concept. By emphasising the skills required to define a new concept the concept model provides a realistic training for all students whether they pursue academic or vocational occupations. The concept model maximizes comprehension and minimizes learning time when a person confronts a new concept.

In conclusion, the concept model provides a systematic organizer for content identification in a curriculum . It provides an integration of content and specifies skills to achieve the content objectives. It emphasises a concrete introduction which increases affective response and provides a rational psycological-pedagogical base for learning. Its stages reflect a Piagetian developmental approach to learning. It provides for revision of conclusions and a rational base for the implementation of more complex organizers such as theories and systems.

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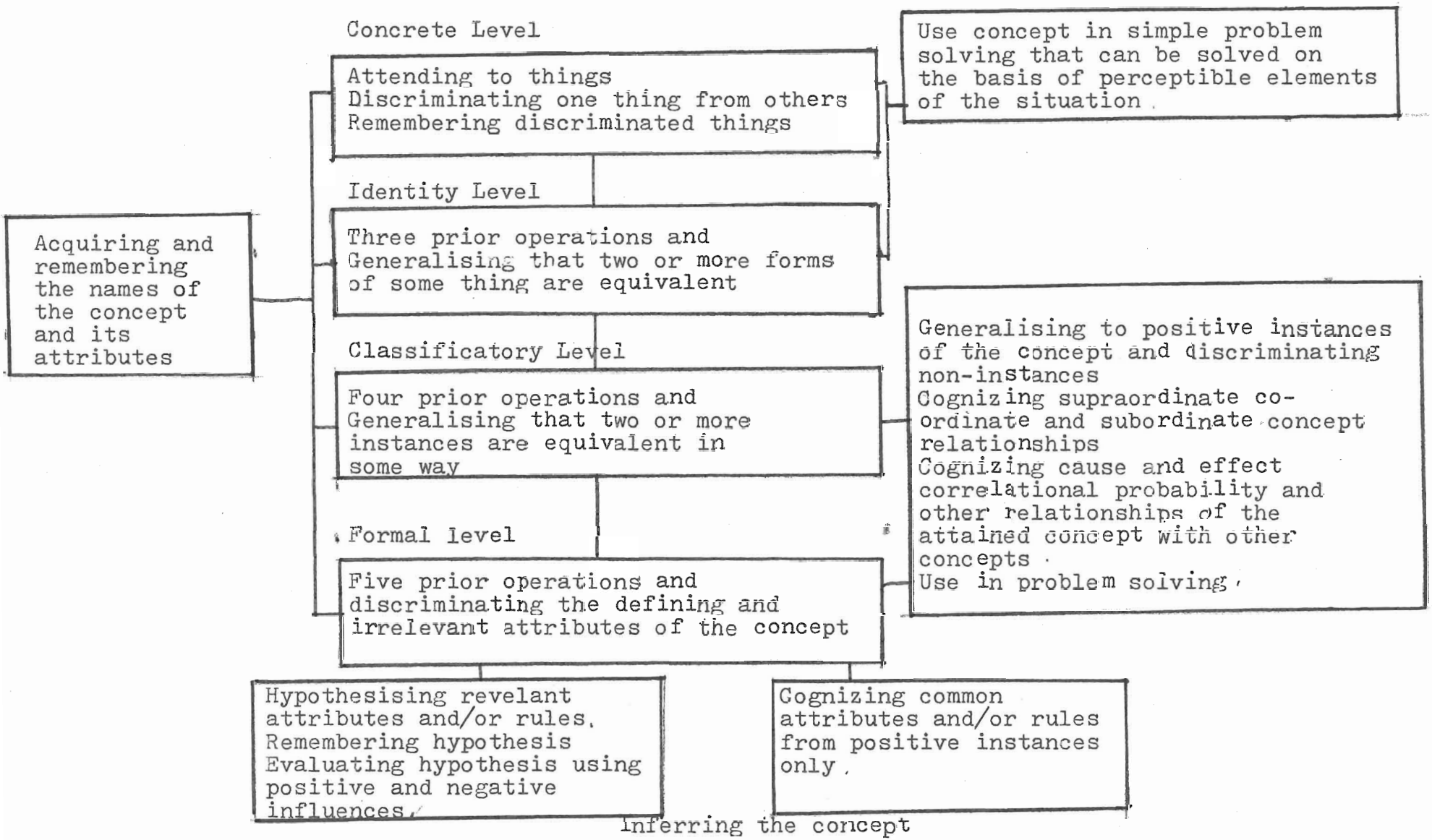
APPENDIX ONE

THE CONCEPT DEVELOPMENT MODEL

The Concept Development Model



APPENDIX TWO

Basic Thinking Skills Involved in The Concept Development Model

CORRESPONDENCE

Application to many-to-many correspondence situations (4)
Can determine whether two sets are proportional (by one to many matching) (3a)
Construct proportional sets through to many correspondence (2a)

Can determine whether two sets are equivalent (by one to one matching) (3)
Can construct an equivalent set through one to one matching (2)
Can match items one to one (1)

OBSERVATION

Can extend the range of perception through the use of simple mechanical aids. (9)
Preplans observational activities (8)
Observes the effect on a system of some operation on one part of the system (7)
Can select more than one object possessing a salient (self-determined) characteristic (6)
Can select more than one object possessing a salient (given) characteristic (5)
Can locate a second object which is like a given object with a stipulated characteristic (4)
Can locate an object possessing a particular feature (3)
Can respond to a variety of characteristics of an object (2)
Differentiation and co-ordination of the various sensory approaches of the environment (1)

Classification

Recognizes that a number of language varients can be linked to each of the three standard efficients representations (6)

Can construct an appropriate representation (Venn diagram cross-clarification table or tree diagram) given verbal description of the date 5(a)

Can interpret an appropriate representation (Venn diagram, cross-clarification table, or tree diagram) 5(b)

Selects elements which fits in the intersection of two overlapping classes 3(c)

Identify by name an element which belongs in the intersection of two classes designated by name only 2(c)

Can describe the multiple membership of any designated element 3(b)

Can divide a given collection into two or more classes and recognize that some elements from each class form another class. Can locate the boundary of the new class 3(a)

Can completely apportion a collection into disjoint sets on the basis of one criterion and then can re-sort the same collection into disjoint sets on the basis of another criterion. 1(d)

Classification cont'd

Can completely partition a collection into disjoint sets on the basis of a (self-selected) criterion 1(c)	Associates class name with boundary and discusses inclusion and exclusion of elements in relation to this class 2(b)
Can select all objects possessing a salient self determined characteristic from a given collection. 1(b)	Can identify the boundary of a class 2(a)
Determine whether a particular object belongs in a defined class 1(a)	

APPENDIX THREE

TABULATION OF QUESTIONNAIRE RESULTS

Government

Age Seriation for Participating Students

Student	Rank
E7	1
E9	2
E6	3
E2	4
E1	5.5
E3	5.5
E4	7
E8	8
E10	9
E5	10
C5	11
C9	12
C8	13
C3	15
C6	15
C10	15
C7	17
C4	18
C2	19
C1	20
A4	21
A6	22
A9	23
A2	25
A7	25
A8	25
A3	27.5
A10	27.5
A1	29
A5	30

Government

Score and Age Correlation For the Level Concrete

Student	Test Rank	Age Rank	Difference	Difference Squared
C8	1	13	12	144
E10	2	9	7	49
A10	4.5	27.5	23	529
E2		4	.5	.25
E5		10	5.5	30.25
E7		1	3.5	12.25
E1	8	5.5	2.5	6.25
E3		5.5	2.5	6.25
E9		2	6	36
C6	10.5	15	4.5	20.25
E6		3	7.5	56.25
A3	13	27.5	14.5	210.25
A6		22	9	81
C5		11	2	4
C4	16	18	2	4
C7		17	1	1
E4		7	9	81
A8	18.5	25	6.5	42.25
C9		12	6.5	42.25
A4	20.5	21	.5	.25
E8		8	11.5	132.25
A1	22.5	29	6.5	42.25
A9		23	.5	.25
A5	24.5	30	5.5	30.25
C2		19	5.5	30.25
C1	26	20	6	36
A2	27	25	2	4
C3	28.5	15	13.5	182.25
C10		15	13.5	182.25
A7	30	25	5	25

Government

Score and Age Correlation For the Level Classification

Student	Test Rank	Age Rank	Difference	Difference Squared
E6	1	3	2	4
C8	2	13	11	121
E7	4	1	3	9
E9		2	2	4
E10		9	5	25
C7	6	17	11	121
E3	7	5.5	1.5	2.25
E1	8.5	5.5	3	9
E5		10	1.5	2.25
C9	10	12	2	4
C4	11	18	7	49
C5	12.5	11	1.5	2.25
E8		8	5.5	30.25
E2	14.5	4	10	100
E4		7	7.5	56.25
C3	16.5	15	1.5	2.25
C6		15	1.5	2.25
C2	18	19	1	1
C1	19	20	1	1
A5	20	30	10	100
A6	22.5	22	.5	.25
A8		25	2.5	6.25
A9		23	.5	.25
C10		15	7.5	56.25
A10	25	27.5	2.5	6.25
A1	26	29	3	9
A4	27.5	21	6.5	42.25
A7		25	2.5	6.25
A3	29	27.5	1.5	2.25
A2	30	25	5	25

Government

Score and Age Correlation for the Level Identify Attributes

Students	Test Rank	Age Rank	Difference	Difference Squared
E1	1.5	5.5	4	16
E10		9	7.5	56.25
C7	3	17	14	196
E6	5	3	2	4
E7		1	4	16
E9		2	3	9
C4	8	18	10	100
C6		15	7	49
E3		5.5	2.5	6.25
C5	10.5	11	.5	.25
E8		8	2.5	6.25
C1	12.5	20	7.5	56.25
E5		10	2.5	6.25
C10	14	15	1	1
C3	16.5	15	1.5	2.25
C8		13	3.5	12.25
E2		4	11.5	132.25
E4		7	9.5	90.25
C9	19	12	7	49
C2	25	19	6	36
A1		29	4	16
A2		25		
A3		27.5	2.5	6.25
A4		21	4	16
A5	25	30	5	25
A6		22	3	9
A7		25		
A8		25		
A9		23	2	4
A10		27.5	2.5	6.25

Environmrnt

Age Seriation for Participating Students

Student	Rank
E7	1
E9	2
E1	3
E2	5
E5	5
E6	5
E4	7.5
E10	7.5
E3	9
E8	10
A10	11
A4	12
A3	13
A6	14
A8	15.5
A9	15.5
A7	17
A1	18.5
A5	18.5
A2	20
C8	21
C9	22
C4	23
C2	24.5
C3	24.5
C10	6
C5	27
C1	28
C6	29
C7	30

Environment

Score and Age Correlation for the level Concrete

Student	Test Rank	Age Rank	Difference	Difference Squared
A2	1	20	19	361
A7	2	17	15	225
E9	3	2	1	1
A1	4.5	18.5	14	196
A10		11	6.5	42.25
A4	6.5	12	5.5	30.25
E4		7.5	1	1
C5	9	27	18	324
C8		21	12	144
E10		7.5	1.5	2.25
C6	12	29	17	289
A5		18.5	6.5	42.25
A9		15.5	3.5	12.25
E2	15	5	10	100
E7		1	14	199
E8		10	5	25
C3	18.5	24.5	6	36
C7		30	11.5	132.25
E3		9	9	81
E6		5	13.5	182.25
A6	21	14	7	49
A3	22.5	13	9.5	90.25
E1		3	19.5	380.25
C4	24.5	23	1.5	2.25
C10		26	1.5	2.25
C9	26.5	22	4.5	20.25
A8		15.5	11	121
E5	28	5	23	529
C1	29	28	1	1
C2	30	24.5	5.5	30.25

Environment

Score and Age Correlation for the Level Classification

Student	Test Rank	Age Rank	Difference	Difference Squared
C1	3	28	25	625
C4		23	20	400
C7		30	27	729
A5		18.5	15.5	240.25
A9		15.5	12.5	156.25
C6	8	29	21	441
C9		22	14	196
A4		12	4	16
A7		17	9	81
E10		7.5	1.5	2.25
C2	14.5	5	10	100
A1		18.5	4	16
A2		20	5.5	30.25
E9		2	12.5	156.25
A8		15.5	1	1
A10		11	3.5	12.25
E2		5	9.5	90.25
E6		5	9.5	90.25
C3	24.5	24.5		
C5		27	3.5	12.25
C8		21	3.5	12.25
C10		26	1.5	2.25
A3		13	11.5	132.25
A6		14	10.5	110.25
E1		3	21.5	462.25
E3		9	15.5	240.25
E4		7.5	17	289
E5		5	19.5	380.25
E7		1	23.5	552.25
E8		10	14.5	210.25

Environment

Score and age correlation for the Level Identify Attributes

Student	Test Rank	Age Rank	Difference	Difference Squared
A3	6.5	13	6.5	42.25
A7		17	10.5	110.25
A8		15.5	9	81
E1		3	3.5	12.25
E2		5	1.5	2.25
E3		9	2.5	6.25
E4		7.5	1	1
E5		5	1.5	2.25
E6		5	1.5	2.25
E7		1	5.5	30.25
E8		10	3.5	12.25
E10		7.5	1	1
C1	21.5	28	6.5	42.25
C2		24.5	3	9
C3		24.5	3	9
C4		23	1.5	2.25
C5		27	5.5	30.25
C6		29	7.5	56.25
C7		30	8.5	72.25
C8		21	.5	.25
C9		22	.5	.25
C10		26	4.5	20.25
A1		18.5	3	9
A2		20	1.5	2.25
A4		12	9.5	90.25
A5		18.5	3	9
A6		14	7.5	56.25
A9		17	4.5	20.25
A10		11	10.5	110.25
E9		2	19.5	380.25

Age Seriation for Participating Students

Student	Rank
E7	1
E9	2
E6	3
E2	4
E1	5.5
E3	5.5
E4	7
E8	8
E10	9
E5	10
A10	12
A3	12
A1	12
A9	14
A6	15.5
A8	15.5
A5	18
A4	18
A2	18
A7	20
C5	21.5
C8	21.5
C1	23.5
C9	23.5
C2	26
C6	26
C7	26
C10	29.5
C3	29.5
C4	30

Heritage

Score and Age Correlation for the Level Concrete

Student	Test Rank	Age Rank	Difference	Difference Squared
E1	2.5	5.5	3	9
E2		4	1.5	2.25
E6		3	.5	.25
E9		2	.5	.25
C2	7	24	17	289
E3		5.5	1.5	2.25
E5		11	4	16
C9		21.5	14.5	210.25
E10		9	2	4
A1	11.5	12	.5	.25
E4		7	4.5	20.25
E7		1	10.5	110.25
E8		8	3.5	12.25
A3	15	12	3	9
A4		18	3	9
C5		20	5	25
C1	19	21.5	2.5	6.25
C6		24	5	25
C7		24	5	25
A8		15.5	3.5	12.25
C10		26.5	7.5	56.25
A5	24	18	6	36
A7		19	5	25
C8		20	4	16
A9		14	10	100
A10		12	12	144
A2	27	18	9	81
C3	28.5	26.5	2	4
C4		28	.5	.25
A6	30	15.5	14.5	

Heritage

Score and Age Correlation for the Level Classification

Student	Test Rank	Age Rank	Difference	Difference Squared
A8	1	15.5	14.5	210.25
E1	5.5	5.5		
E2		4	1.5	2.25
E3		5.5		
E4		7	1.5	2.25
E5		11	5.5	30.25
E6		3	1.5	2.25
E7		1	4.5	20.25
E9		2	3.5	12.25
A1	11	12		
A7		19	8	64
E8		8	2	4
C2	14	24	10	100
C7		24	10	100
A10		12	2	4
C5	17	20	12	144
A9		14	3	9
E10		9	8	64
C4	20.5	28	7.5	56.25
C6		24	3.5	12.25
C9		21.5	1	1
C10		26.5	5	25
A3	24.5	12	12.5	156.25
A4		18	6.5	42.25
A6		15.5	9	81
C8		20	4.5	20.25
C1	28	21.5	6.5	42.25
C3		26.5	1.5	2.25
A5		18	10	100
A2	29	18	11	121

Heritage

Score and age Correlation for the Level Identify Attributes

Student	Test Rank	Age Rank	Difference	Difference Squared
E8	1	8	7	49
C1	3	21.5	18.5	342.25
C3		26.5	23.5	552.25
C9		21.5	18.5	342.25
C4	10	28	18	342
C8		30	10	100
C10		26.5	16.5	272.25
A4		18	8	64
A7		19	9	81
A8		15.5	5.5	30.25
A9		14	4	16
A10		12	2	4
E3		5.5	5.5	30.25
E4		7	7	49
E10		9	9	81
E1	23	5.5	17.5	306.25
E2		4	19	361
E5		11	12	144
E6		3	20	400
E7		1	22	484
E9		2	21	441
C2		24	1	1
C5		29	6	36
C6		24	1	1
C7		24	1	1
A1		12	11	121
A2		18	5	25
A3		12	11	121
A5		18	5	25
A6		15.5	7.5	56.25

APPENDIX FOUR

Table of Scores Averages and Percentages on The Questionnaire

Table of Scores averages and Percentages on the Questionnaire

Heritage Level

	Concrete			Classification			Identify Attributes		
Grade	3	5	8	3	5	8	3	5	8
Raw Score	61	52	91	51	54	86	9	5	6
Average	6.1	5.2	9.1	5.1	5.4	8.6	.9	.5	.6
Percentage	61	52	91	51	54	86	90	50	60
				Government Level					
Grade	3	5	8	3	5	8	3	5	8
Raw Score	186	190	237	72	211	268	0	56	93
Average	18.6	19	23.7	7.2	21.1	26.8	0	5.6	9.3
Percentage	60	61.2	76.45	21.8	63.9	81.2	0	35	58.1
				Environment Level					
Grade	3	5	8	3	5	8	3	5	8
Raw Score	300	345	338	0	0	0	0	3	8
Average	30.0	34.5	33.8	0	0	0	0	.3	.8
Percentage	69.7	80.2	78.6	0	0	0	0	30	80

APPENDIX FIVE

The Questionnaire

THE QUESTIONNAIRE

Throughout the questionnaire a multiple choice format has been used. Questions have been designed to test each level of the specific concept: environment, government and heritage. Wherever possible each level of each concept has been tested using three reference points: three dimensional, two dimensional and print. The three dimensional questions are based upon the child'd experience. The two dimensional questions are based upon specific pictures included in the questionnaire. The print questions are based upon specific written descriptions included in the questionnaire.

All questions on each concept are answered successively rather than in random, intermingled order. The definition of each concept is asked first to avoid any possible learning from experience with the concept questions.

Instructions to Students

1. Read each question carefully.
2. For some questions you may pick two or more choices that are correct. For other questions only one choice will be correct.
3. Circle the letter at the beginning of each statement that you think is correct. Example, (a) all bears are black. (b) all bears are covered with hair.
4. If you want to change your answer put an X through the answer you want to change. Example (X) all bears are black (b) all bears are covered with hair.
5. Once you finish the questions on each page, do not go back and change your answer, so, answer each question carefully.

6. When you have completed the test give it back to your teacher.

7. Be sure that you write your birthday in the right place.

8. Fill in the blanks

My birthday is _____ day

_____ month

_____ year

Instructions for Teachers

1. Please administer the tests in the morning.

2. Please insure each child records his birthday correctly.

3. Please separate any of the following questionnaires from the group as they are handed in.

(a) any child who is in an integrated special education program.

(b) any child that is in an english as a second language program.

(c) any child that is or has been accelerated.

Please separate these questionnaires as they are handed in since there are no names on them.

4. Please ensure the early finishers work quietly until the time is complete

5. Please read the instruction page for the student aloud to the class and be sure they understand the instructions.

6. Do not answer any questions once the students have begun answering the questionnaire.

7. Please start the class at the same time.

ENVIRONMENT

Pick out the statement which gives the best definition of environment.

(a) Environment includes everything around a living thing: the objects, people and ideas.

(b) Environment includes the people around you.

(c) Environment includes the objects around you.

(d) Environment includes the ideas around you.

(e) Environment includes everything around an animal.

(f) Environment includes everything around a person.

Concept: environment

Level: Concrete

A. Three Dimensional

2. Circle the names of objects that belong in your home.

(a) stove
(b) refrigerator
(c) cupboards
(d) family pictures
(e) bed
(f) china cabinet
(g) box of tools
(h) shower
(i) radio
(j) television
(k) chest of drawers

3. Circle the names of objects that belong in your school

(a) desk
(b) basketball
(c) encyclopedias
(d) readers
(e) chalk
(f) crayons
(g) tape recorder
(h) record player
(i) stove

4. Circle the names of objects that belong to your town

(a) stop sign
(b) drug store
(c) sofa
(d) hockey rink
(e) library
(f) swimming pool
(g) gas station
(h) factory
(i) stove

5. Circle the name of people that belong to your home

(a) mother
(b) father
(c) sister or brother
(d) carpenter
(e) teacher
(f) engineer
(g) mechanic
(h) store clerk

6. Circle the names of people that belong to your school

(a) mother
(b) father
(c) sister or brother
(d) carpenter
(e) teacher
(f) engineer
(g) mechanic
(h) store clerk

7. Circle the names of people that belong to your town

(a) mother
(b) father
(c) sister or brother
(d) carpenter
(e) teacher
(f) engineer
(g) mechanic
(h) store clerk

8. Which of these sayings would you hear at home?

(a) You must finish your homework before you go to bed.
(b) Don't throw snowballs at recess.
(c) Geometry is the study of shapes
(d) Pay for your things at the cash register.
(e) We will go to Nova Scotia for our vacation this summer.
(f) Attention, please. The store is closing in five minutes.

9. Which of these sayings would you hear at your school?

(a) You must finish your homework before you go to bed.
(b) Don't throw snowballs at recess.
(c) Geometry is the study of shapes.
(d) Pay for your things at the cash register.
(e) We will go to Nova Scotia for our vacation this summer.
(f) Attention, please. The store is closing in five minutes.

10. Which of these sayings would you hear somewhere in town?

(a) You must finish your homework before you go to bed.
(b) Don't throw snowballs at recess.
(c) Geometry is the study of shapes.
(d) Pay for your things at the cash register.
(e) We will go to Nova Scotia for our vacation this summer.
(f) Attention, please. This store is closing in five minutes.

Concept: Environment

Level: Concrete

Read the description. Circle the statements that are true about the description.

Rufus Harris is an old man now. He was born and raised in Northern Ontario and spent his life farming near Parry Sound. His family were pioneers in the area. There were few other people and a lot of forest. The family had to work hard in the summer to be sure they had enough food to last through the winter. People did not see each other often as we do to-day but they did get together for dances, barn raising, harvesting and fall fairs.

Most people lived by the rule that you must take care of yourself. Everyone had a large family and everybody in the family helped on the farm. Families did help each other on big jobs such as barn building. All of the children went to school but very few stayed in school for as many years as you will to-day.

11. (a) There were few people around when Rufus grew up.
(b) There were many people around when Rufus grew up.
(c) The area had many farms.
(d) The area had few farms.
(e) Farming was easy because the land was well cleared.
(f) People worked together on big jobs.
(g) All of the children finished high school.

Concept: Environment

Level: Classificatory

Read the two descriptions then circle the statements that are true about both descriptions

Verna was raised on a farm in Northern Onyario. She walked two miles to school each day. After school, she would help around the farm. When she went to high school, she had to move to the nearest town. When she finished high school, she got married and moved to Southern Ontario. She always wanted to be a nurse but she never went back to school.

Al was raised on a farm near Toronto. He walked a mile to school each day. After school, he worked on the farm. By the time he was in high school his parents had sold their farm and moved to the city so he could live at home while he was going to school. When he finished school, he started working for a bank. He was a hard worker so he became a manager of the bank.

12. (a) Both Verna and Al were raised on farms
    (b) Both Verna and al moved away from home to go to high school
    (c) Both Verna and Al were married.
    (d) Both Verna and Al worked hard all of their lives.
    (e) Both Verna and Al worked for the bank,

13. Choose the best definition of government

(a) Government describes the people who rule us.

(b) Government describes the rules made for people

(c) Government describes the selection of representatives by groups of people. The representatives act as leaders and have authority to make rules for people.

(d) Government describes groups of people making rules for themselves.

(e) Government describes leaders making rules for groups of people.

Questionnaire

Concept; government

Level; concrete

The teacher is a leader in your classroom. Pick out the things that describe your teacher.

14. (a) Solve problems for you
(b) Tells you how much work you have to do
(c) Helps the class get their work done
(d) Does not help you solve problems.
(e) Tells you what to do sometimes.

From the list circle the name of another person who is a leader.

15. (a) principal
(b) mayor
(c) mechanic
(d) carpenter
(e) store clerk
(f) hockey coach

Read the story then circle the things that are true in the story.

Mr. Brown is a cub leader. He has a meeting every Thursday night. He tells all the boys to be there at seven o'clock. He always starts the meeting by having the boys stand in a circle around the flag. He helps the

boys with their work and projects.

16. (a) Mr. Brown tells the boys when to come to the meetings.
(b) Mr. Brown is married.
(c) Mr. Brown was a cub when he was a little boy.
(d) Mr. Brown helps the boys with their work.

Authority

Your parents have authority over you . Circle the things that describe your parents.

17. (a) They tell you what to do
(b) You do what they tell you, usually.
(c) You have five parents.

Here is a list of people. Circle the name of one person with authority.

18. (a) principal
(b) carpenter
(c) mayor
(d) policeman
(e) pilot
(f) truck driver

Read the story. Pick out the things that describe the story.

John is an indian chief. His people trust him and do what he tells them to. John works in a factory and he has his own farm. The people in his tribe think that he is the smartest man. When he makes a rule they follow his rule.

19. (a) John tells other people what to do.
(b) John makes rules.
(c) Other people follow his rules.
(d) John is married.
(e) Other people do not follow his rules.
(f) People follow his rules only if they want to.

Group

Your class is a group. Circle the things that are true about your class.

20. (a) People talk to each other
(b) Most people are friendly.
(c) The people live close to each other,
(d) no-one likes anybody else.

Here is a list. Circle the names of other groups of of people.

21. (a) Cub pack
(b) Hockey team
(c) School club
(d) Coaches' association.
(e) Teachers at your school

Read this description. Circle the things that are true about the description.

Steve belongs to a gang. There are six boys in the gang. They all live in his neighborhood. They have secret meetings. They talk about what they are going to do in the summer. They wan to go on a long hike to another town. The boys like to do things together.

22. (a) The boys argue a lot.
(b) The boys agree about things.
(c) The boys live in different towns.
(d) The boys live in the same town.
(e) They are interested in the same things.
(f) They talk to each other often.

Law

Read these statements. Circle the ones that might be a rule at home.

23. (a) You must finish your homework before you waths television.
(b) You must wait for the green light before you cross the road.
(c) You cannot throw snowballs at recess.
(d) You must ask your parents if you want to leave the room.

Here are some statements. Circle the ones that are rules

24. (a) I think I'll go swimming on Saturday.
(b) We just got a new dog.
(c) Please give me two chocolate bars.
(d) Don't leave the lights on.
(e) Take a shower before you go in the pool.

Representative

Read the description, Circle the things that are true about it.

Joe is our class representative. We picked him. We picked him because he said he would be in charge of organizing a class trip for us and a party for our class. Joe goes to the meetings for all the representatives. They help to decide the rules to set for school. They help solve the problems we have in our school.

25. (a) Joe decided to be the representative.
(b(Joe will do things for his class.
(c) Joe helps to set the rules.
(d) Joe goes to meetings if he feels like it.

Questionnaire

Concept: Government

Level: Classificatory

Leader

Your teacher is a leader. Your principal is too. Circle the things that describe both people.

26. (a) They both tell people what work to do.
(b) They both help people solve problems.
(c) They both work in the same room.
(d) They both never tell people what to do.
(e) Neither one of them help people with problems.

Read the following descriptions. Circle the statements that are true about both descriptions.

John is the leader of the gang. There are five people in his gang. They obey him when he tells them what to do. All of the boys are ten years old. They have a clubhouse in the garage of one boy's house. The boys like John because he can solve most of the problems that they have. All of the boys want to be policemen when they grow up.

Dave is the leader on his baseball team. There are ten people on his team. Dave is the best pitcher and a very good batter. Dave tells the boys what position

they will play in the outfield and he sets up the batting order. He has good ideas about how to solve problems like playing a really good team. The boys all want to be baseball players when they grow up.

27. (a) The boys listen to John and Dave.
(b) John and Dave want to do the same things when they grow up.
(c) John and Dave are the same age.
(d) John and Dave solve problems for their groups.
(e) There are more than two boys in both John's group and Dave's group.
(f) John and Dave live in the same neighborhood.

Authority

Both your teacher and your parents have authority over you. Circle the things that are true about your teacher and your parents.

28. (a) They can tell you what to do.
(b) They both work in the same place.
(c) People usually obey them when they give an order.
(d) They always go bowling on Saturday night.
(e) People never obey them when they give an order.

Here are two discriptions of people with authority. Read each one then circle the things that are true for both people.

Mr. Short is a foreman for a hydro crew. There are eight men in his crew. They are responsible for all the electric wires in Bramalea. They repair them if they are broken or old. They make sure that everybody has electricity. Mr. Short tells his men what jobs they must do. The men always do the jobs that Mr. Short asks them to do because he can fire them if they do not. Many people depend on Mr. Short to keep the hydro lines working

Mr. Brown runs an ice cream company. He has thirty men working for him. They run all the machines to make

the ice cream and they deliver the ice cream to the stores. Mr. Brown must be sure that everything runs well and that the stores do not run out of ice cream. He gives the men certain jobs and they do the jobs because they do not want to be fired. The store owners depend on Mr. Brown to deliver his ice cream to their stores so they can sell it. Mr. Brown is forty years old and he has been working for his company for twent-one years.

29. (a) Mr. Short and Mr. Brown have the same job.
(b) They both live in the same town.
(c) They have both had their jobs for a long time.
(d) Their men must obey them.
(e) They both control more than ywo men.

Groups

Your class is a group. Some other groups are: a hockey team, a baseball team, a cub pack, a brownie pack, a music club at school,a stamp club, a gym club in your town. Circle the things that tell how any two of these groups are the same.

30. (a) Both groups have two or more people.
(b) The group members are interested in the same thing.
(c) Everyone in the group is the same size.
(d) Everyone lives in the same town.
(e) everyone gets along well, usually.

Here is a description of two groups. Read each one, then circle the things that are true for both groups. The stamp club has seven members. They have been meeting for six months. They all enjoy stamp collecting. They enjoy talking to and working with each other. They meet with their teacher after school every Tuesday night. Everyone brings his own stamp collection.

The gymnastic club has been meeting for two years now. They meet at Earnscliffe arena because they all live near by. They enjoy learning new things from their coach because she was once a champion gymnast. They enjoy working with the other people in the club. They meet twice a week on Tuesday night and Saturday morning. They are from twelve to fifteen years old. There are twelve people in the club now.

31. (a) Both groups have the same number of members.
(b) Both groups have more than two members.
(c) Both groups have men leaders.
(d) Both groups have leaders.
(e) All the people in one group live in the same area
(f) All the people in one group are interested in the same thing.

Law

You have rules at home and at school. Circle the things that are true about the rules at home and at school.

32. (a) They both tell you what time to go to bed.
(b) They both tell you the things you can't do
(c) They both tell you the things you have to do.
(d) They both are the same for everybody.
(e) There is a punishment if you break the rules at home or at school.

Read each discription. Circle the things that tell about each description.

For any sport you might play, there are many rules to remember. The rules tell you how to play the game. They tell you what you can and cannot do. Everyone must play using the same rules. There is usually a penalty or some other punishment if the rules are broken. The rules are made so that you know what to expect in a game.

In order to be a good driver, you must follow the traffic rules whether you ride a bicycle or motorcycle or drive a car. Every driver must follow the rules. If you do not follow the rules, you may be punished in some way. Everyone must follow the rules to keep the roads safe for all people. The rules tell you how to drive safely. They tell you what you can and cannot do.

33. (a) Both sets of rules tell people what they can do.
(b) Both sets of rules tell people what they cannot do.
(c) Both sets of rules are about the same thing
(d) Both sets of rules have punishments if you break them.
(e) The rules apply to all people equally.
(f) The rules apply to only some people and not to others.

Representatives

The Brampton city council has representatives from Bramalea
The provincial government has representatives from Bramalea
Circle the things that are true for both representatives.

34. (a) A large group of people picked each person to be a representative.
(b) The representative tells the people about the meetings he goes to.
(c) The representative very rarely speaks to people.
(d) The representative does what the people ask him to do.
(e) The representative never does what the people ask him to do
(f) The people can replace the representative if he does not do a good job.
(g) The representative helps make rules and solve problems

Here are descriptions of two representatives. Read them then circle the things that are true about both descriptions

Mr. Knox is a representative of the company union. All the men at his factory picked him to go to the meetings for them. At the meetings, there are representatives from eight factories. The representatives make rules for the men and try to solve any problems the men are having in the factory. They usually meet once a month in an office in Toronto. Mr. Knox was picked to be the

representative for one year. If he does a good job, the men might pick him again. If he does a bad job, the men will pick someone else. After each meeting he tells the men what they decided. If the men have a problem he tells the other representatives so they can help solve the problem. Mr. Knox has been working for the same company for ten years. He drives ten miles to work each day.

Mr. Bailey is a representative on the city council. He was picked by the people who live in his area to be the representative for the next two years. He goes to all the council meetings and he usually writes a letter to all the people in his area to tell them what the meeting was about. If the people in his area have a problem he will tell the other representatives at a council meeting and they will try tp solve it. Mr. Bailey can be picked again by the people if he does a good job but if he does not do a good job they will probably not pick him again.

35. (a) Both men were picked by a group of people.
(b) Both men go to meetings with other representatives.
(c) They try to solve the problems of the people who pick them.
(d) Both men were picked for the same length of time.
(e) The men try to solve the problems themselves.
(f) The people are pleased with both men.
(g) If the people are pleased with them they may pick them again.

Concept: Government

Level: Identify Attributes

Here is a list of statements about a leader. Some statements fit into or are part of other statements, for example; the statement "a bear has hair on his legs" and "a bear has hair on his head" fit into or are part of

the statement "a bear has hair all over his body".

circle the statement about a leader that are true for all leaders.

36. (a) A leader helps a girl guide pack
(b) Everyone in a group likes their leader.
(c) Everyone usually obeys the leader.
(d) Few people obey their leader.
(e) A leader helps a group of people.
(f) A leader solves problems for a group of people.
(g) A group of people solve problems for the leader.

Authority

Circle the statements that are true about all people with authority. Leave out the statements that are true about only some people with authority.

37. (a) A person with authority tells other people what to do.
(b) A person with authority is seldom obeyed.
(c) A person with authority has control over five people.
(d) A person with authority has control over all the people in the school.
(e) A person with authority controls one or more people.
(f) A person with authority can punish people if they do not obey him.
(g) A person with authority tells younger people what to do.

Groups

Read the following statements about groups. Circle only the statements that are true about all groups. Leave out the statements that are only true about some groups.

38. (a) A group has more than five people.
(b) Usually, the people in a group live close to each other.
(c) A group has two or more people.
(d) Members in a group usually get along well with each other.
(e) Members in a group want different things.
(f) Members in a group want the same thing.
(g) People in a group live far away from each other.

Law

Read the following statements about law. Circle only the ones that are true about all laws. Leave out the ones that are true about only some laws.

39. (a) Laws tell people what they can do.
(b) Laws tell people what they cannot do when they are driving.
(c) There is usually a punishment for breaking a law.
(d) There is usually a punishment for breaking a law about stealing.
(e) The laws are made for everybody to obey.
(f) The laws are made for some people to obey.

Representatives

Read these statements about representatives. Circle only the ones that are true about all representatives. Leave out the ones that are true about only some representatives.

40. (a) Representatives are picked by a group of five people.
(b) Representatives are picked by a group of two or more people.
(c) Representatives help solve people's problems.
(d) Representatives help make rules about safety.
(e) Representatives help make rules about many different things.
(f) Representatives lose their job if they do not do it well.
(g) Representatives help solve problems about money.

Heritage

Pick the best meaning for heritage.

41. (a) Heritage means the objects we own.
(b) Heritage means the objects our parents give us.
(c) Heritage means the ideas our parents teach us.
(d) Heritage means the things our parents thought were important.
(e) Heritage means the property our parents give us.
(f) Heritage means the objects, properties and ideas that our parents give us. These things were important to them and us.
(g) Heritage means the objects, property and ideas our parents give us. These things were important to us but not to them

Questionnaire

Concept: Heritage

Level: Concrete

Read the description. Circle the statements that are true from the description.

One of the most important things that I own is a a watch that my grandfather gave me. He was very proud of it and so am I. I don't wear it often because I am afraid of losing it but it still runs and is very accurate. It is the kind of watch you keep attached to a long gold chain in your pocket.

42. (a) The watch was given to me by my grandfather.
(b) My grandfather always wore the watch.
(c) I always wear the watch
(d) The watch is in good condition.
(e) The watch is valuable to me.
(f) The watch is very old.

Read the description then circle the statements that are true.

When my father quit farming, he gave his farm to me. He owned the farm for a long time. His father bought the farm about sixty years age. Now, I am the farmer. It is a large farm and the soil is very good. I am not rich but I make a good living on my farm. I have been working on the farm ever since I was a small boy. My father left me the farm in his will.

43. (a) I was given the farm by my father.
(b) I had to buy the farm.
(c) My grandmother owned the same farm.
(d) My father left me the farm in his will.
(e) It is a small farm.
(f) My father bought the farm.

Read the following descriptions. Circle the statements that are true about the descriptions.

My father taught me to be honest with other people He always tried to do this. This idea was very important to him. My grandfather taught my father to be honest and my father taught me to be honest. It was important for my father to be honest and it is important to me also. I hope that my son will also think that

honesty is important.

44. (a) My father thought that honesty was very important.
(b) My grandfather thought that honesty was very important.
(c) I don't think that honesty is very important.
(d) I think that honesty is very important.
(e) My grandfather did not think that honesty is very important.

Questionnaire

Concept: Heritage

Level: Identify Attributes

Here are some statements that describe the idea of heritage. Some statements can be included in other statements as part of them, for example; the statements "a bear has hair on his legs" and "a bear has hair on his head" are included in the statement "a bear has hair on his whole body".

Choose only the statements that describe all the examples of heritage.

45. (a) Heritage includes the objects such as watches and books that our parents leave us.
(b) Heritage includes the large objects such as farms and factories that our parents leave us.
(c) Heritage includes any ideas such as respect for others that our parents have taught us.
(d) Heritage includes the idea that everyone can speak freely.
(e) Heritage includes the idea that we pick the people who govern us.
(f) Heritage includes furniture that our parents leave us.
(g) Heritage includes houses that our parents leave us.

Level: Classification

Read the following descriptions. Circle the statements that are true for both descriptions.

My father gave me his old family bible when he died. It was very special to him because his father had owned it and left it to him. It has a family tree in it which lists all his relatives back to the year eighteen hundred.

It looks very old. The pages are yellow with age and the cover is torn. It is very special to me.

My wife is very proud of a necklace that her mother gave her. Her mother had the necklace for forty years. My wife does not wear the necklace very often because she is afraid she might lose it, but she is very glad that her mother gave it to her. She hopes to be able to give it to someone some day. Her mother always treasured the necklace.

46. (a) Both people received the things from their parents.
(b) Only one person received the gift from their parents.
(c) Both people think the gift is very valuable.
(d) Both people think the gift is worthless.
(e) The parents of both people thought the gift was valuable.
(f) The parents of both people did not think the gift was valuable.

Read these two descriptions. Circle the statements that are true for both descriptions.

When my father retired he left his business to me. He had a plumbing business. He was proud of his business and he was proud of the reputation it had. I was glad to take over the business and proud too. I hope to do as well as my father did.

My wife was given a cottage by her mother. The cottage is in Muskoka. Her mother took good care of the cottage. She had owned it for twenty years. My wife will also take good care of the cottage. It is always neat and clean, just the way her mother kept it.

47. (a) Both people were given something by their parents.
(b) The parents were proud of what they gave.
(c) Both people were glad to get the gifts.
(d) Both people want to keep the gift.
(e) Both people do not want the gifts.

(f) The parents of both people did not like the thing they gave to their children
(g) Both parents had owned the thing for a long time before they gave it away.

Read these two descriptions. Circle the statements that are true for both descriptions.

My father taught me to be honest with people always. He never liked anyone to be dishonest. He was never dishonest even if it meant he might be punished. He always wanted me to be honest and I always want to be honest. His grandfather taught him to be honest and he taught me to be honest.

My parents taught me to respect other people. Never treat anyone as if you are better than they are. Both my parents had been taught that when they were children and they taught me. I hope I can teach my children that because I think it is important.

48. (a) The parents thought that honesty and politeness were important.
(b) The parents tried to teach the child to be honest and polite.
(c) The child believed that honesty and politeness were important.
(d) The child did not believe that honesty and politeness were important.
(e) The parents did not try to teach the children that honesty and politeness were important.